





# Diversion of Water and Niagara River

U.S. Army, Corps of Engineers.

## LETTER FROM THE SECRETARY OF WAR

HD 1694

. A 2

TRANSMITTING

1421

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORTS  
BY COL. J. G. WARREN, CORPS OF ENGINEERS, AND THE  
BOARD OF ENGINEERS FOR RIVERS AND HARBORS, OF AN  
INVESTIGATION AUTHORIZED BY PUBLIC RESOLUTION NO. 8,  
SIXTY-FIFTH CONGRESS, OF THE SUBJECT OF WATER  
DIVERSION FROM THE GREAT LAKES AND THE NIAGARA  
RIVER, INCLUDING NAVIGATION, SANITARY, AND POWER  
PURPOSES, AND THE PRESERVATION OF THE SCENIC BEAUTY  
OF NIAGARA FALLS AND THE RAPIDS OF NIAGARA RIVER.

plate

(Including plates 1-57.)



WASHINGTON

GOVERNMENT PRINTING OFFICE

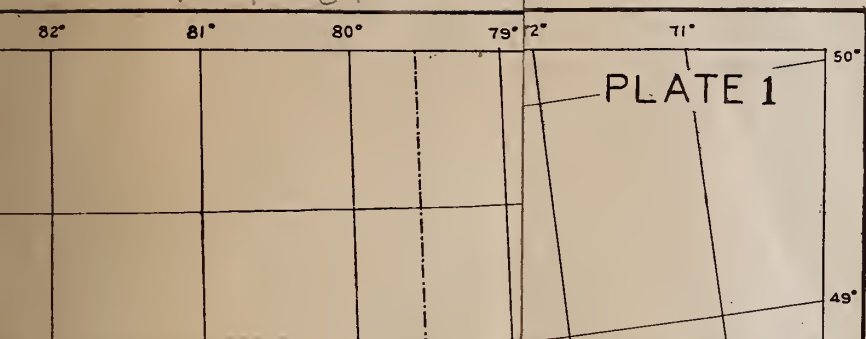
1921

Class \_\_\_\_\_  
Book \_\_\_\_\_



HD 1694  
A2 1921 copy

ineers, U. S. Army.



port folio





HD 1694  
A2 1921  
ccf44

PLATE I



# GREAT LAKES DRAINAGE BASIN AND CONNECTING WATERWAYS

In 1 Sheet. Sheet No. 1. Scale 1:3,600,000

Division Engineer Office, Lakes Division, Buffalo, N. Y. Aug. 1919.  
Submitted: *W. S. Richmond* Approved: *W. S. Richmond*  
Assistant Engineer Colonel, Corps of Engineers.

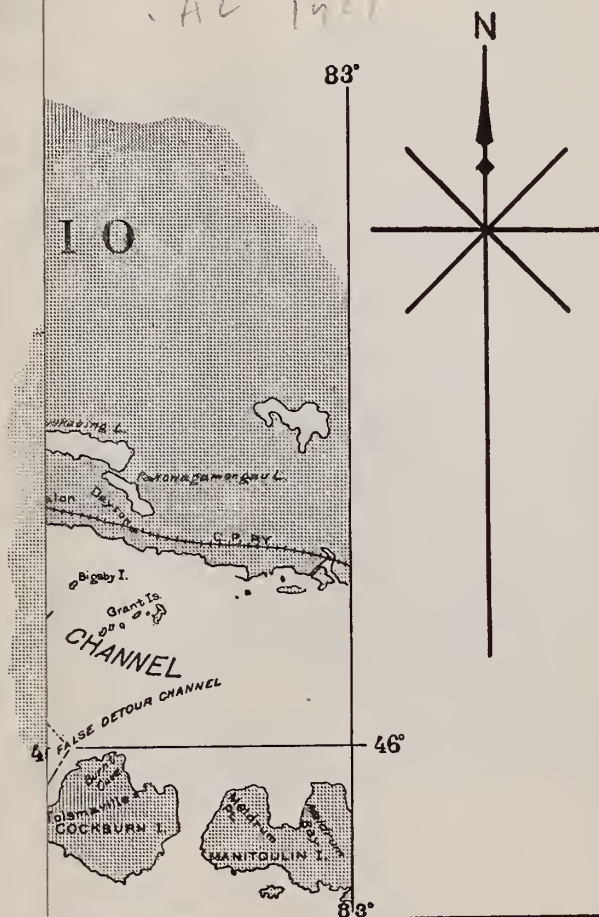
Drawn by *W. J. W.* File No. Transmitted with report dated: Aug. 30, 1919





# PLATE 2

HD 1604  
A2 1921



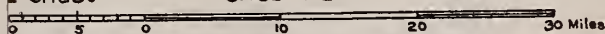
## ST. MARYS RIVER

M I

Sheet

Sheet No. 1

Scale:



Division Engineer Office, Lakes Division, Buffalo, N.Y. Aug., 1919

mitted:

*W.S. Richmond*  
Assistant Engineer

Approved:

*Colonel*  
Colonel, Corps of Engineers

wn by

W.C.C.

File No. ---

Transmitted with report  
(dated: Aug. 30, 1919)



H 1 1  
H 2 1



1911. 10. 10. 10. 10.



1911. 10. 10. 10. 10.

PLATE 3

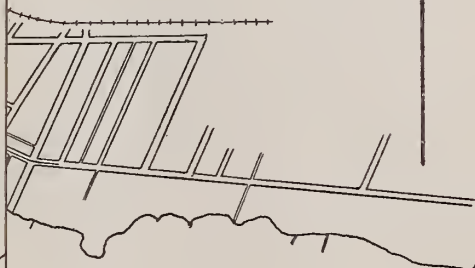
HD 1694

, A2 1921

N



MARIE, ONT.



VIDA

UNDARY

ST. MARYS RAPIDS,  
LOCKS AND CANALS

1 Sheet

Sheet No. 1

Scale:

0 1000 2000 3000 4000 5000 Mile Feet

Division Engineer Office, Lakes Division, Buffalo, N.Y. Aug, 1919

Submitted:

*W.S. Richmond*  
Assistant Engineer

Approved:

*[Signature]*  
Colonel, Corps of Engineers

Drawn by

*W.C.C.* File No. ---

Transmitted with report

dated: Aug. 30, 1919





PLATE 3

HD 10-14

140 1921

N

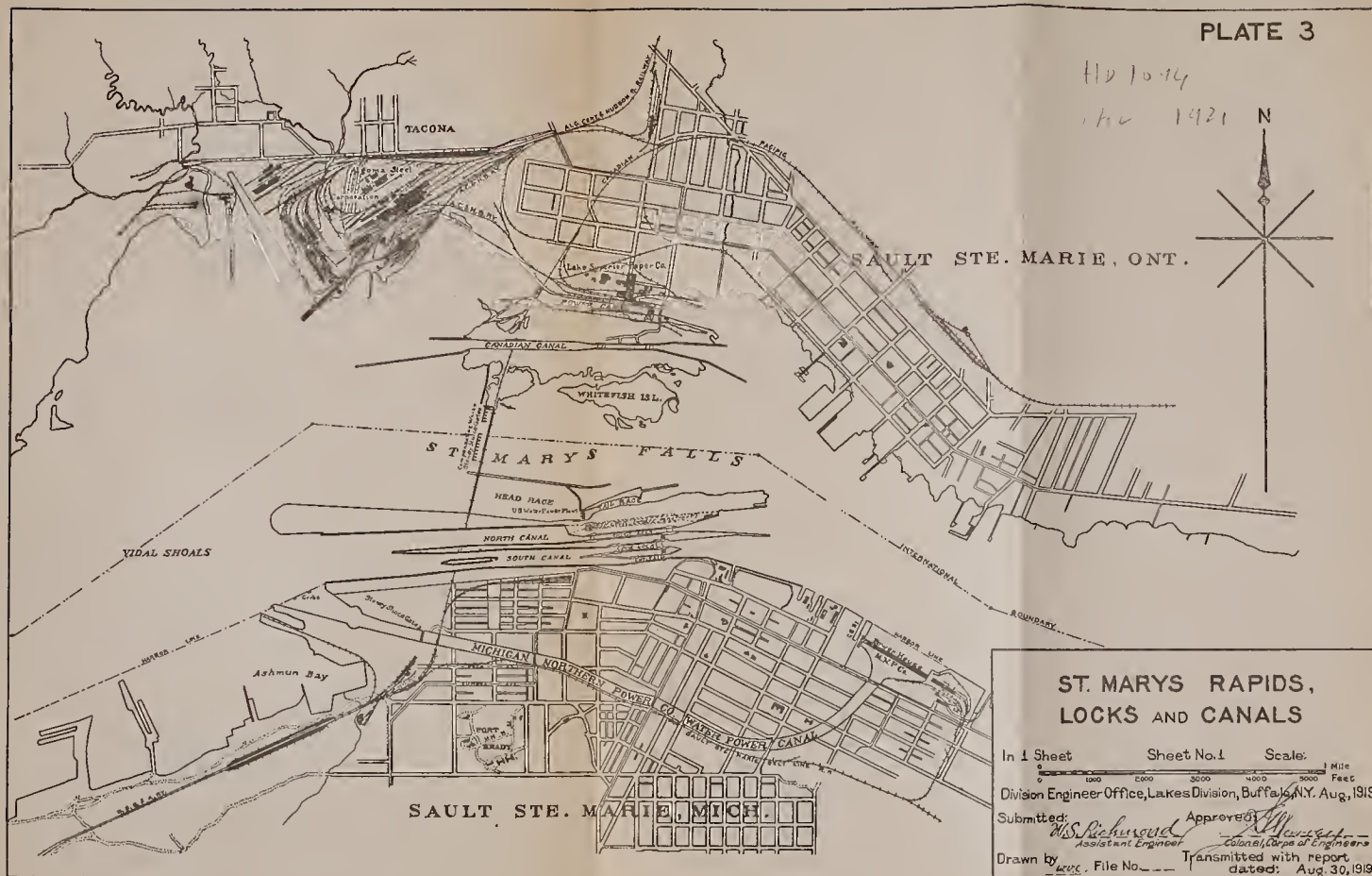




PLATE 4

HD 1694

. A2 1921



## CHICAGO DRAINAGE CANAL

In 1 Sheet

Sheet No. 1

Scale



Division Engineer Office, Lakes Division, Buffalo, N.Y.

Aug., 1919

Submitted:

*W. S. Richmond*  
Assistant Engineer

Approved:

*W. S. Richmond*  
Colonel, Corps of Engineers

Drawn by *W. R. C.*

File No.

Transmitted with report

dated: Aug. 30, 1919

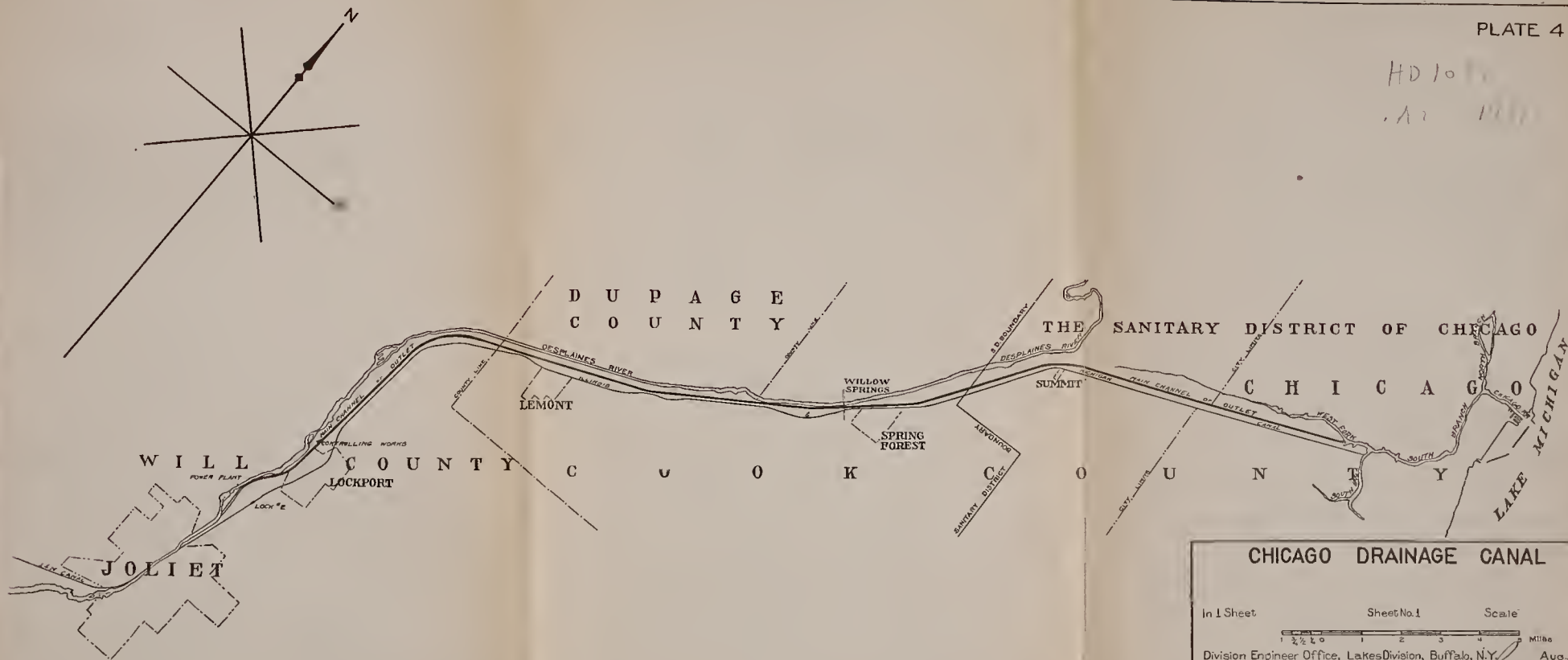




PLATE 4

HD 10

A. 1 1919



## CHICAGO DRAINAGE CANAL

In 1 Sheet

Sheet No. 1

Scale

0 1 2 3 4 Miles

Division Engineer Office, Lakes Division, Buffalo, N.Y. Aug. 1919

Submitted:

*W. S. Richmond*  
 Assistant Engineer

Approved:

*W. S. Richmond*  
 Colonel, Corps of Engineers
Drawn by *W. S. Richmond*

File No.

Transmitted with report

dated: Aug. 30, 1919

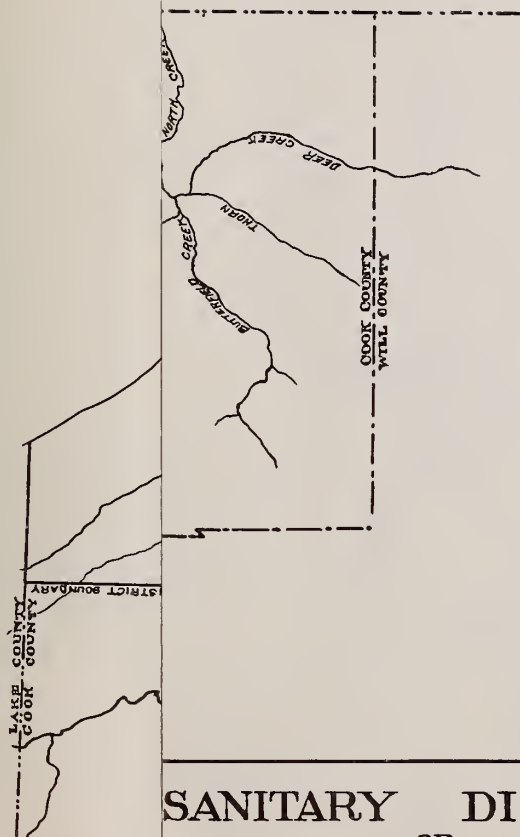


## PLATE 5

HD 1694

A2 1921

N



# SANITARY DISTRICT OF CHICAGO

Sheet

Sheet No. 1

Scale:

Sanitary Engineer Office, Lakes Division, Buffalo, N.Y. Aug., 1919

Submitted:

Approved:

*W. S. Richmond*  
 Assistant Engineer

*Colonel, Corps of Engineers*

 Submitted by *W. S. Richmond*  
 W. S. C. File No. ---

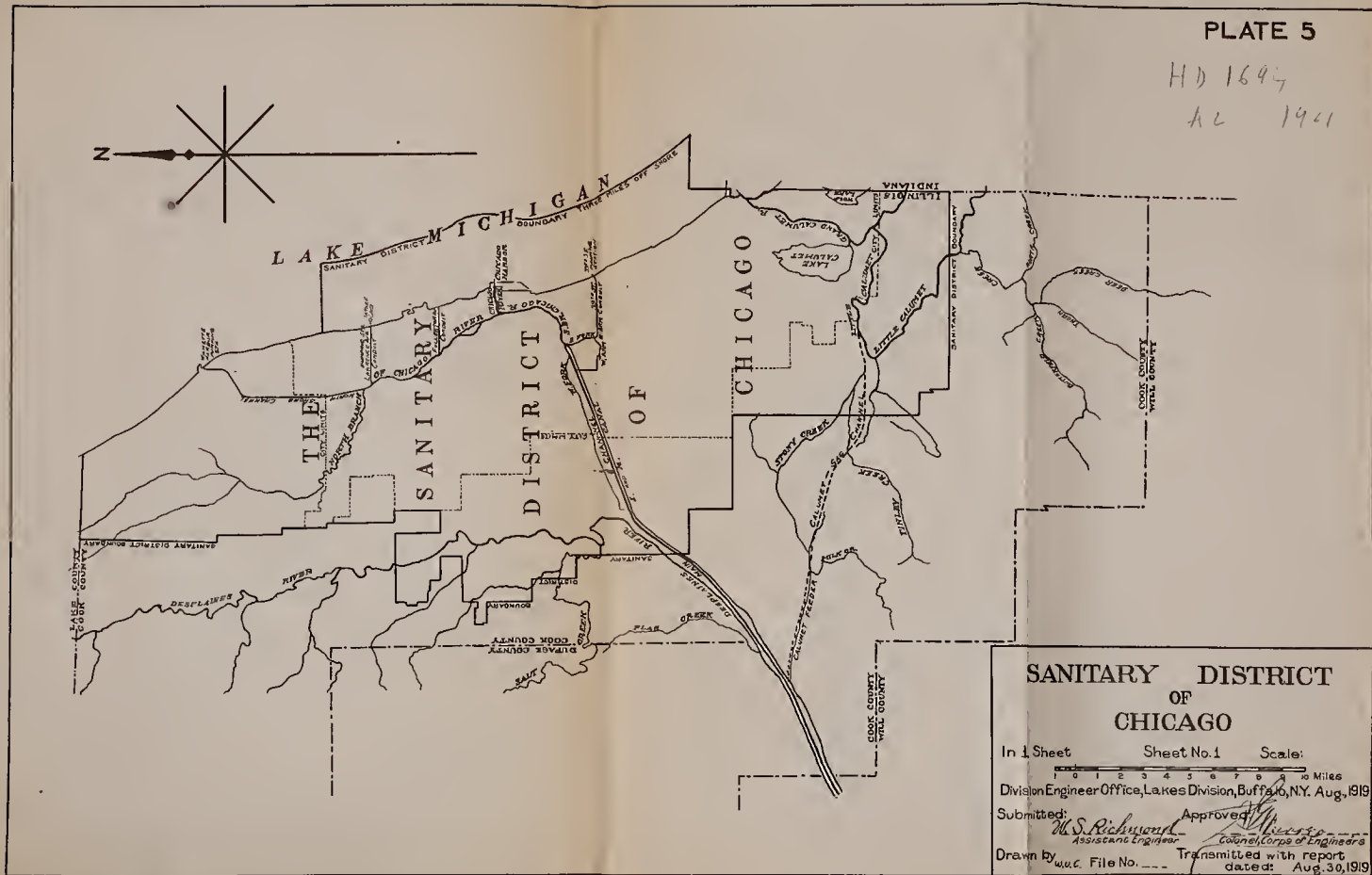
 Transmitted with report  
 dated: Aug. 30, 1919



PLATE 5

HD 1649

AL 1941



# SANITARY DISTRICT OF CHICAGO

In 1 Sheet Sheet No. 1 Scale:

0 1 2 3 4 5 6 7 8 9 10 Miles

Division Engineer Office, Lakes Division, Buffalo, N.Y. Aug. 1919

Submitted: *W.S. Richardson* Approved: *W.S. Richardson*

Assistant Engineer Counsel, Corps of Engineers

Drawn by *W.C. File No. ---* Transmitted with report dated: Aug. 30, 1919





Corps of Engineers, U. S. Army.

12° 50'

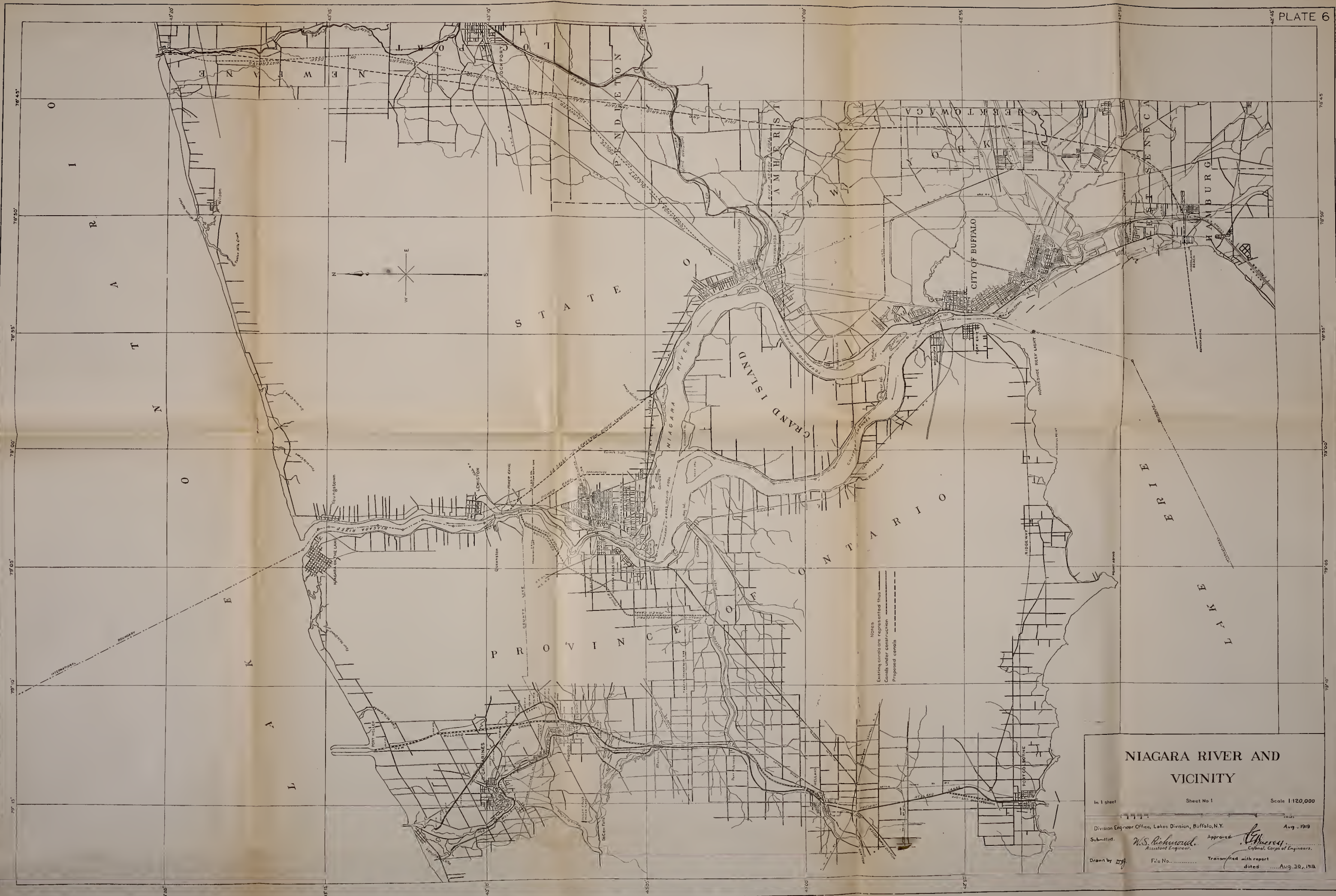
2° 45' PLATE 6

HD 1694  
AZ 1921

ALCOHOL

STANDARD GRADE 920





NIAGARA RIVER AND VICINITY

In 1 sheet Sheet No 1 Scale 1:120,000

Division Engineer Office, Lakes Division, Buffalo, N.Y. Aug. 1919

Submitted: *W.S. Richmond* Assistant Engineer. Approved: *W.S. Richmond* Colonel, Corps of Engineers.

Drawn by *W.S.* File No. Transmitted with report dated: Aug. 28, 1919







neers, U. S. Army.

PLATE 7

HD 1694-

. A2 . 192

78°52'

42°55'



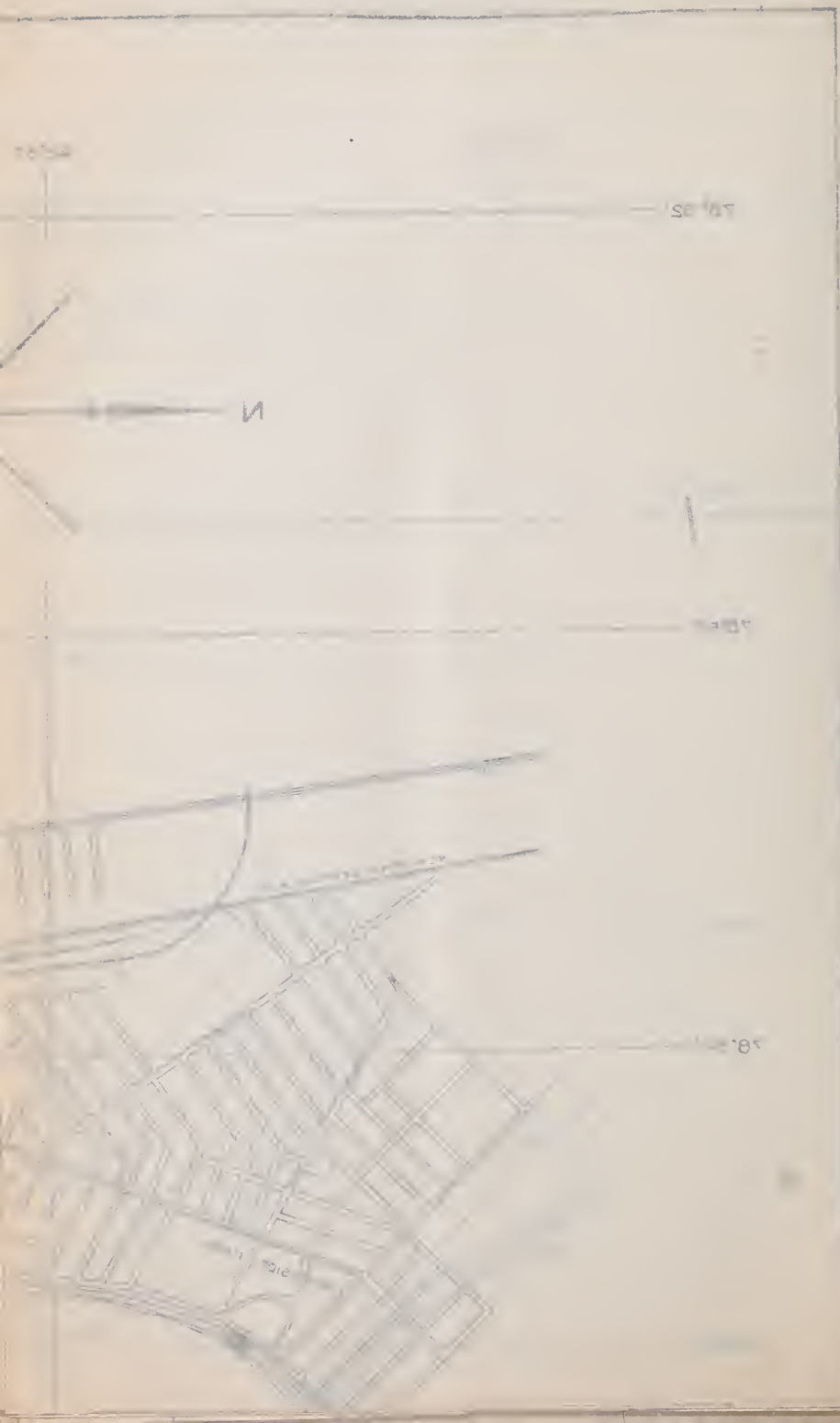


HD 1647  
A2 1919



**BLACK ROCK CANAL  
AND  
VICINITY**

In 1 Sheet      Sheet No. 1      Scale  
 1000 500 0 1000 2000 3000 4000 5000 Feet  
 Division Engineer Office, Lakes Division, Buffalo, N.Y.      Aug. 1919  
 Submitted: *U.S. Richmond*      Approved: *W.H. Smith*  
 Assistant Engineer      Colonel, Corps of Engineers  
 Drawn by *U.S.C.*      File No.      Transmitted with report  
 dated: Aug 30, 1919





ers, U. S. Army.

**PLATE 8**

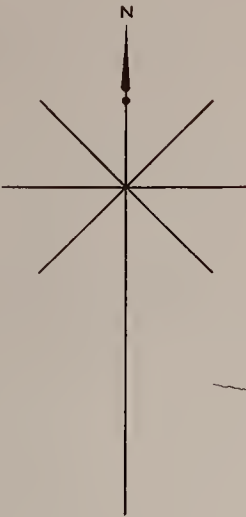
HD 1694

. A2 1921

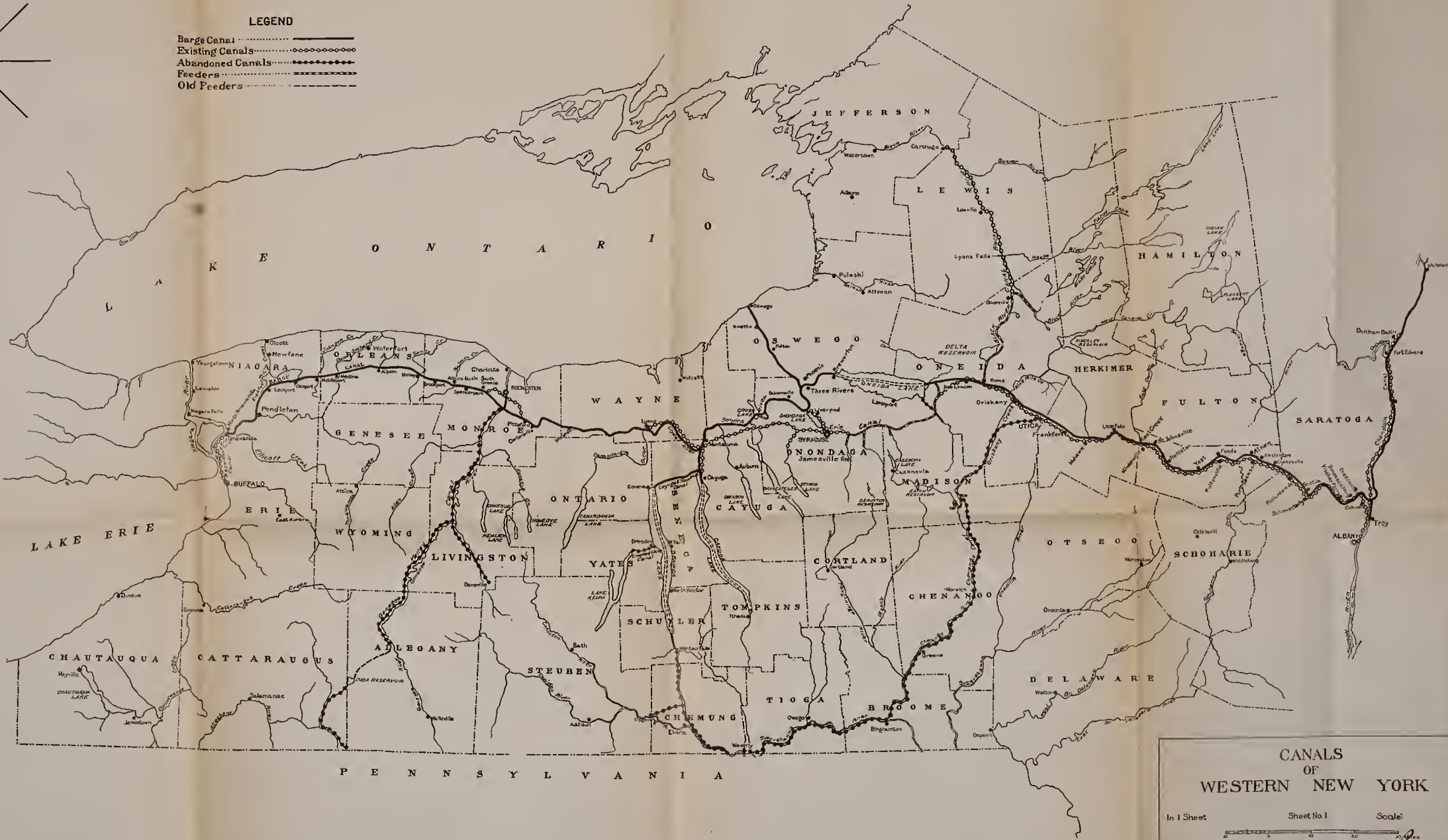




HD 1644  
AC 1421



- LEGEND
- Barge Canal
  - Existing Canals
  - Abandoned Canals
  - Feeders
  - Old Feeders



CANALS  
OF  
WESTERN NEW YORK

In 1 Sheet Sheet No. 1 Scale: 1 inch = 10 miles  
Division Engineer Office, Lakes Division, Buffalo, N. Y. Aug., 1919  
Submitted: Approved: *W. S. Richmond*  
Assistant Engineer Colonel, Corps of Engineers  
Drawn by W. C. C. File No. Transmitted with report dated: Aug. 30, 1919





1871

ers, U. S. Army.

PLATE 9

HD 1694

112 1921

18

20

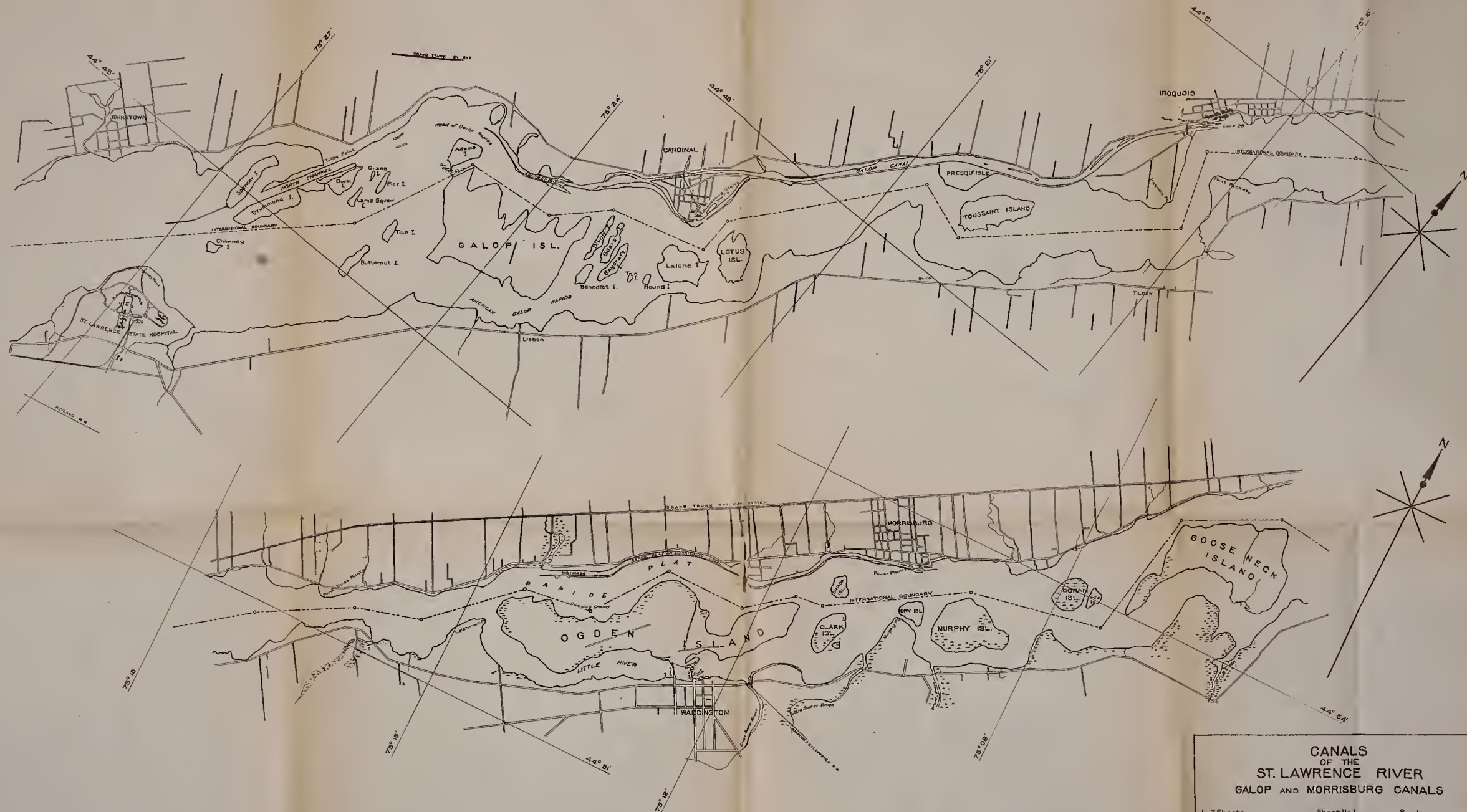




PLATE 9

HD 1641

12 12



**CANALS  
OF THE  
ST. LAWRENCE RIVER  
GALOP AND MORRISBURG CANALS**

In 2 Sheets      Sheet No. 1      Scale, 1" = 10,000 Feet

Division Engineer Office, Lakes Division, Buffalo, N.Y.      Aug. 1919

Submitted: *W.S. Robinson*      Approved: *W.S. Robinson*  
*Assistant Engineer*      *Colonel, Corps of Engineers*

Drawn by *W.D.C.*      File No.      Transmitted with report dated Aug. 30, 1919

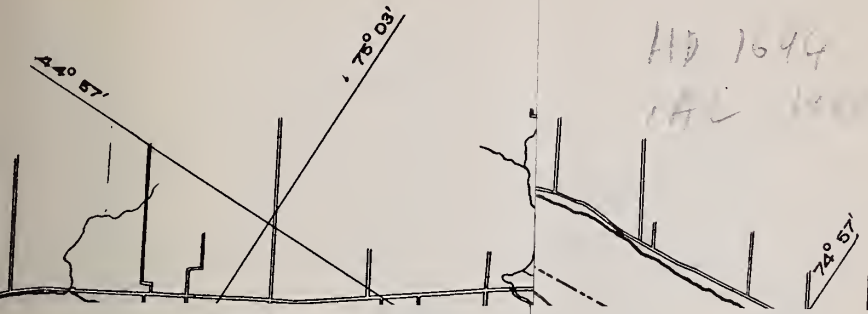


neers, U. S. Army.

PLATE 10

HD 1644

1AL 100









**CANALS  
OF THE  
ST. LAWRENCE RIVER  
FARRAN POINT AND CORNWALL CANALS**

In 2 Sheets      Sheet No. 2      Scale

Division Engineer Office, Lakes Division, Buffalo, N.Y.      Aug. 1919

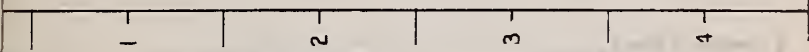
Submitted: *W.S. Richardson*      Approved: *W.S. Richardson*  
Assistant Engineer      Colonel, Corps of Engineers

Drawn by *W.V.C.*      File No. \_\_\_\_\_      Transmitted with report dated: Aug. 30, 1919



Distar

PLATE II



STATE OF TEXAS  
COUNTY OF DALLAS

Know all men by these presents, that I, the undersigned, for and in behalf of the State of Texas, do hereby certify that the within and foregoing is a true and correct copy of the original as the same appears from the records of the State of Texas.

Witness my hand and seal of office at the City of Austin, this 1st day of January, 1901.







Elevations in feet above mean tide, New York

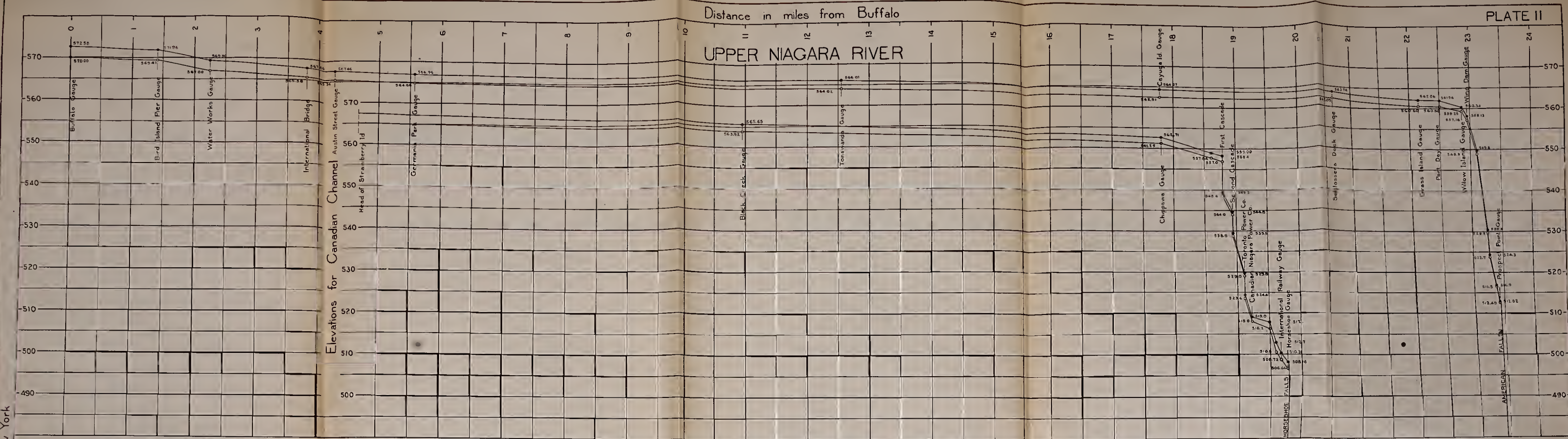
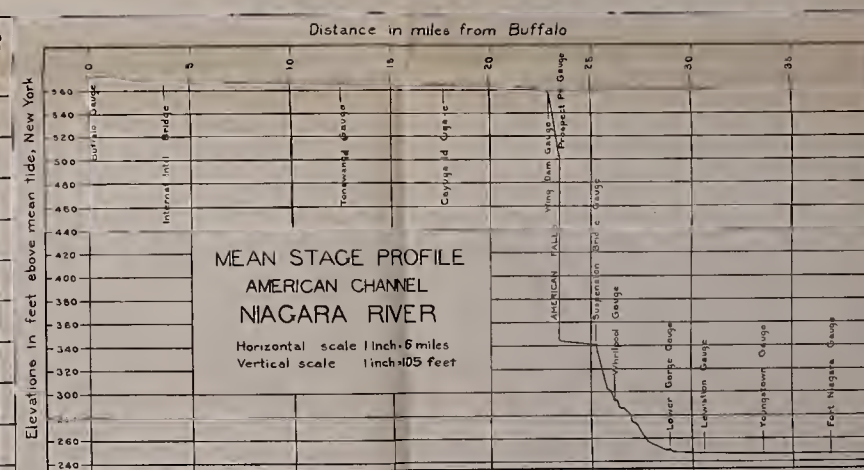
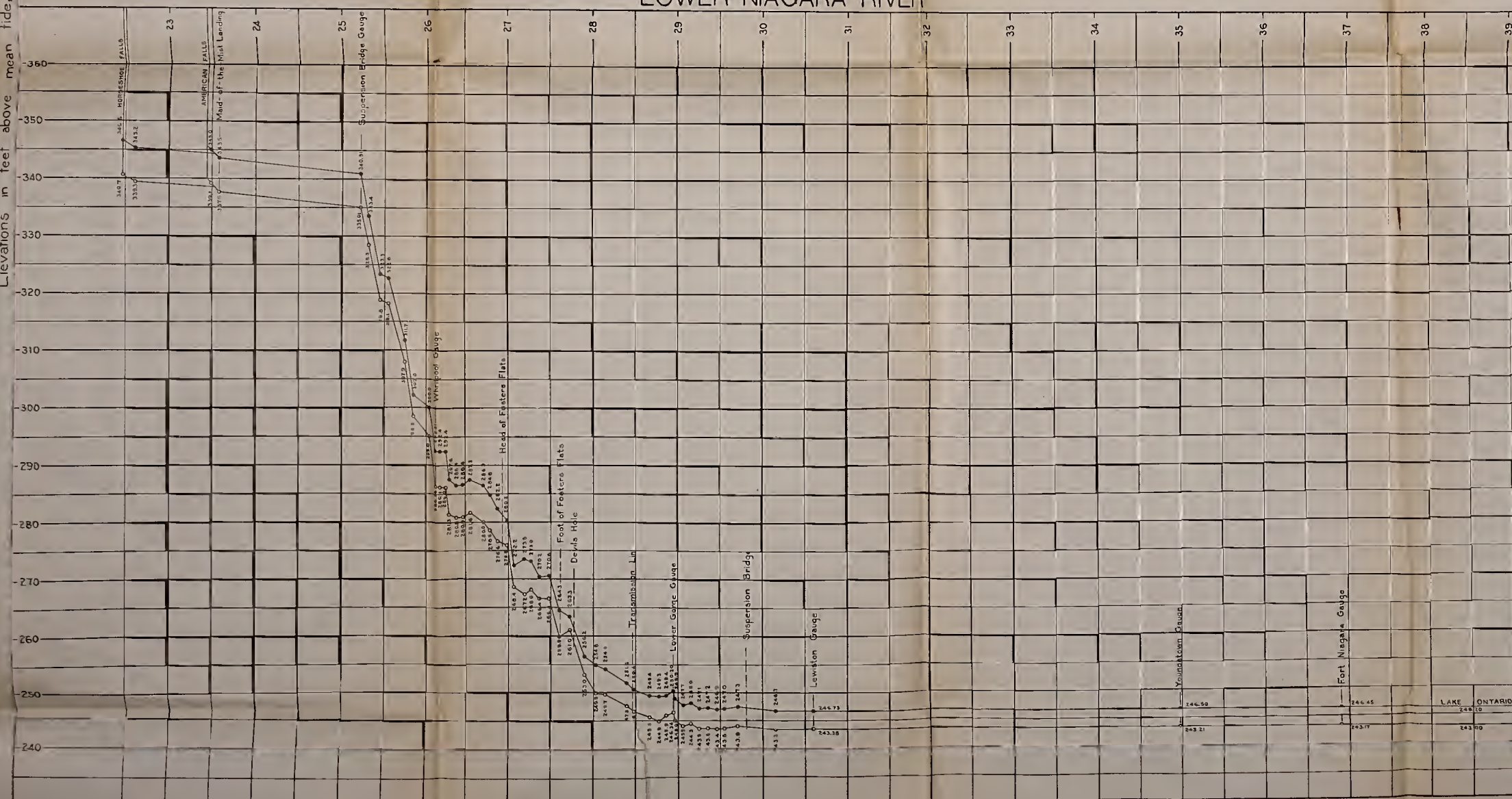


PLATE II

LOWER NIAGARA RIVER



NOTES

Upper Profile shows the slope of the surface of the River for Mean Lake Stages, 51 years 1860-1910 inclusive, which is 572.58 feet for Lake Erie and 246.20 for Lake Ontario.

Lower Profile shows the slope of the River for Standard Low water, which is 570.00 feet for Lake Erie and 243.00 for Lake Ontario.

The Profiles between the Suspension Bridge and Lewiston gauges, were computed from the records of the gauges maintained in the Fall of 1917, with intermediate points as determined by level and transit lines in 1917. The Profiles between the Buffalo and Suspension Bridge gauges, and between the Lewiston gauge and Lake Ontario, were taken from the U.S. Lake Survey Profile of Niagara River, 1912.

PROFILE OF NIAGARA RIVER  
LAKE ERIE TO LAKE ONTARIO

In 1 sheet  
Horizontal scale  
Vertical scale  
Division Engineer Office, Lakes Division, Buffalo, N.Y.  
Submitted  
N.S. Robinson  
Assistant Engineer  
Approved  
Transmitted with report dated Aug. 30, 1919.



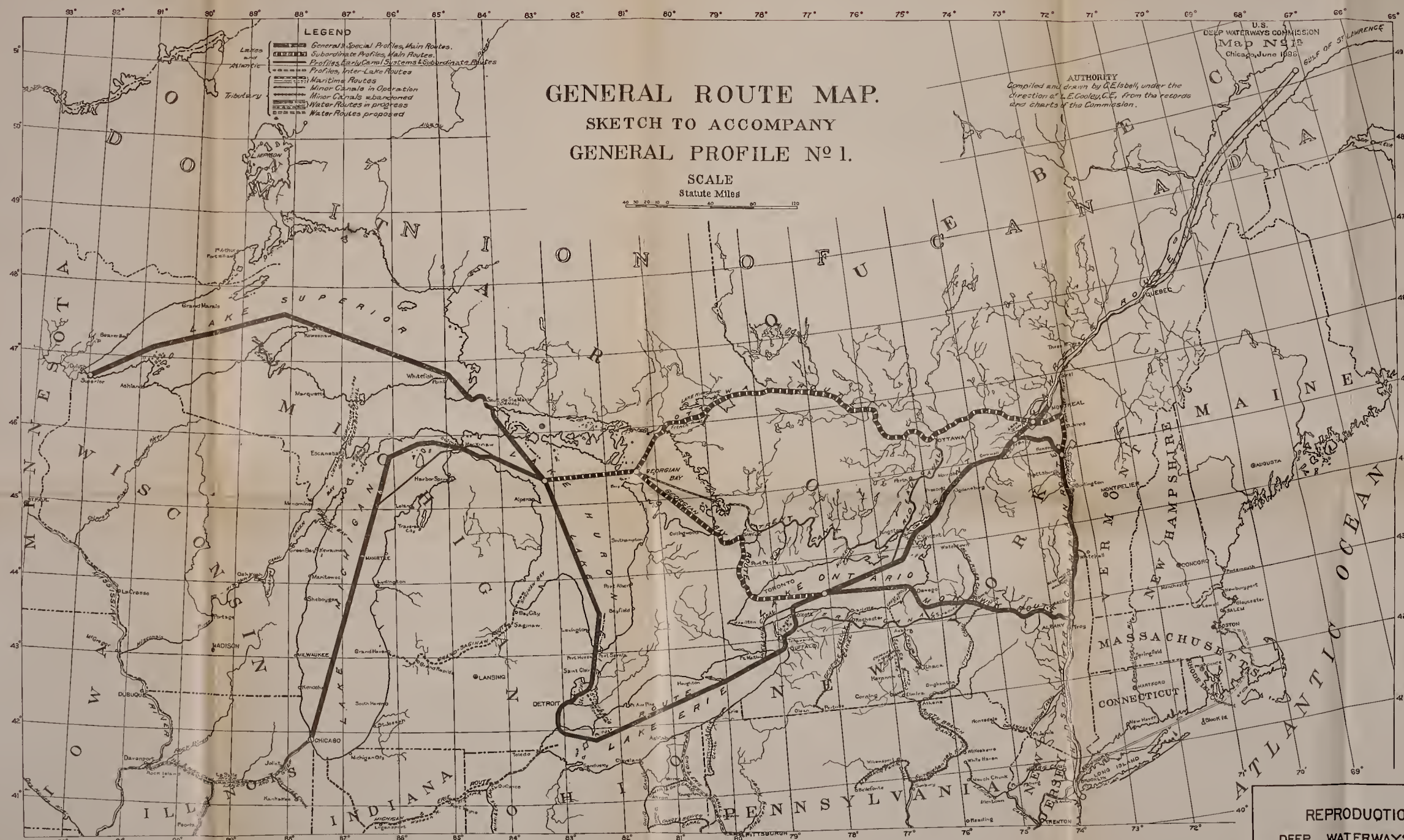


PLATE 12

STATE OF MICHIGAN  
COUNTY OF WASHTENAW







REPRODUCTION OF PLATE 2  
 DEEP WATERWAYS REPORT OF 1897

In 1 Sheet Sheet No. 1 Scale as noted

Division Engineer Office, Lakes Division, Buffalo, N.Y. Aug., 1919  
 Submitted: *W. S. Richmond* Approved: *W. S. Richmond*

Assistant Engineer Colonel, Corps of Engineers  
 Drawn by *W. S. Richmond* File No. Transmitted with report dated: Aug. 30, 1919



F ENGINEERS, U. S. ARMY

78°59'

78°57' PLATE 13





In 2 Sheets                      Sheet No.1                      Scale 1:10,000

Scale of Feet

0 500 1000 1500 2000 2500 Ft

Division Engineer Office, Lakes Division, Buffalo, N.Y.      Aug. 1919

Submitted: W. S. Richmond      Approved: J. H. Hurten  
                          Assistant Engineer                      Chief Engineer of Engineers

Drawn by:      File No.      Transmitted with report      dated      Aug. 30, 1919

                 L.D.P.

NOTES

*Topography on Sugar Hill north of New York City. The Hudson  
Tracks and the top of Sugar Hill and Gray's Cove are prominent  
surveys of the investigation in 1970/1971. Other topography is  
compiled from maps of the U.S. Geological Survey, U.S. Board of  
Engineers and Architects, and the New York City Department of  
Maps and Information. Topography is from maps of the  
U.S. Geological Survey.*

*Geologic Coordinates are based on U.S. Standard Datum  
depending on a Contour.*

Lat. 40°54' 33.220 (seconds) = +42786 ( )  
Long. 74°07'43.1 ( ) = -82786 ( )

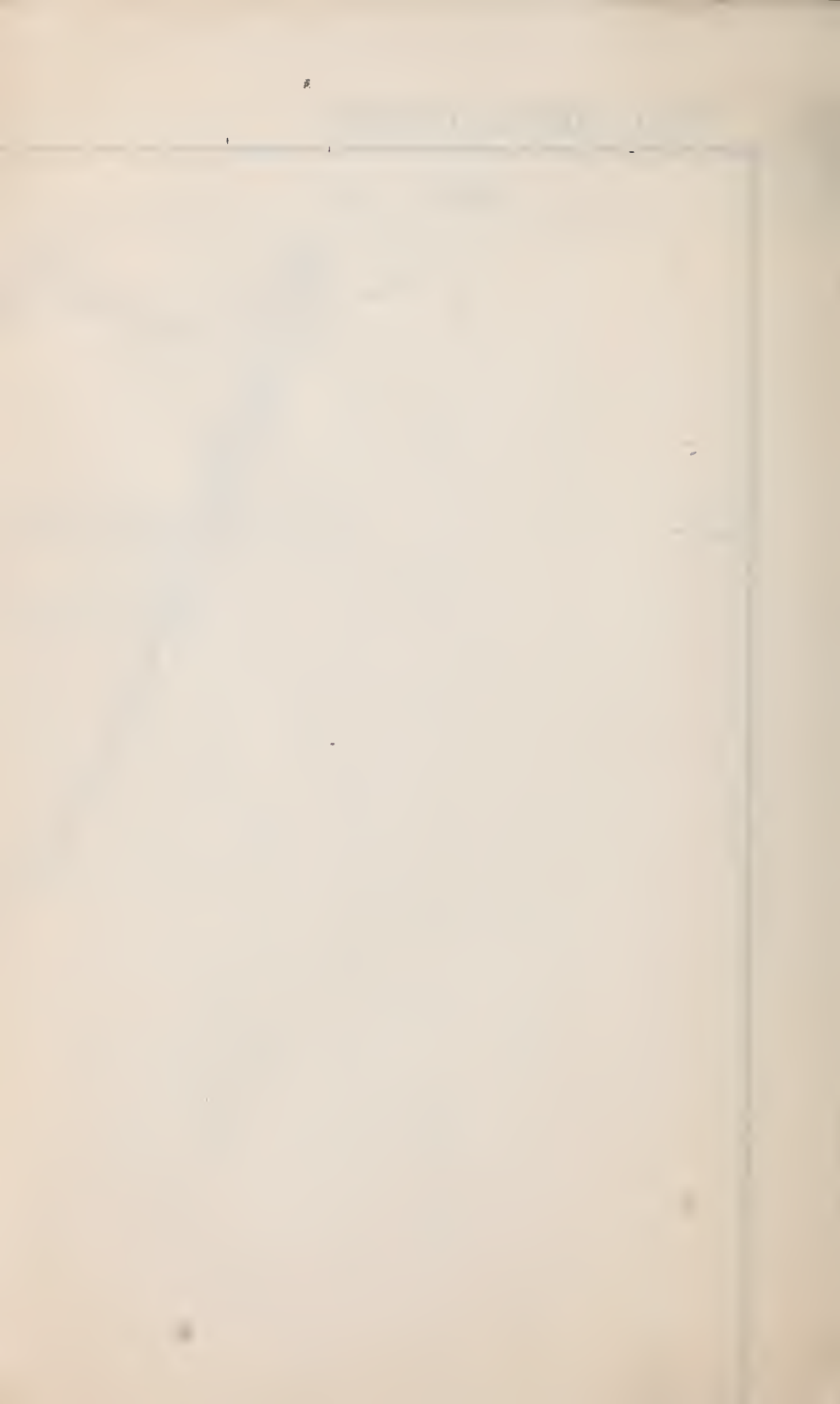
Contours are based on U.S. Standard Datum  
Contours are based on the U.S. Standard Datum, New York City, 1923  
adjustment of levels. Contours in the city of Niagara Falls, N.Y.,  
not included in surveys of 1971-1978 are interpolated from city  
surveys.

Contours of the river bottom show depths of water in fathoms,  
and are referred to the along surface of the river corresponding to  
the contour. Contours are based on the U.S. Standard Datum, New York  
City, 1923 adjustment of levels.

Locations of rock soundings are marked by large dots.  
The lowest elevation reached by the sounding rod is noted next  
to the dot, followed by the letter R. If a ledge rock was reached,  
that is, 526 R.



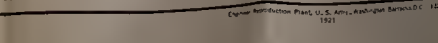




ENGINEERS, U. S. ARMY

78°57' PLATE 14









W

## Corps of Engineers, U. S. Army.

PLATE 15

above mean tide New York

wing stages at the self-registering

ons at gauges

rge Lewiston

247.26

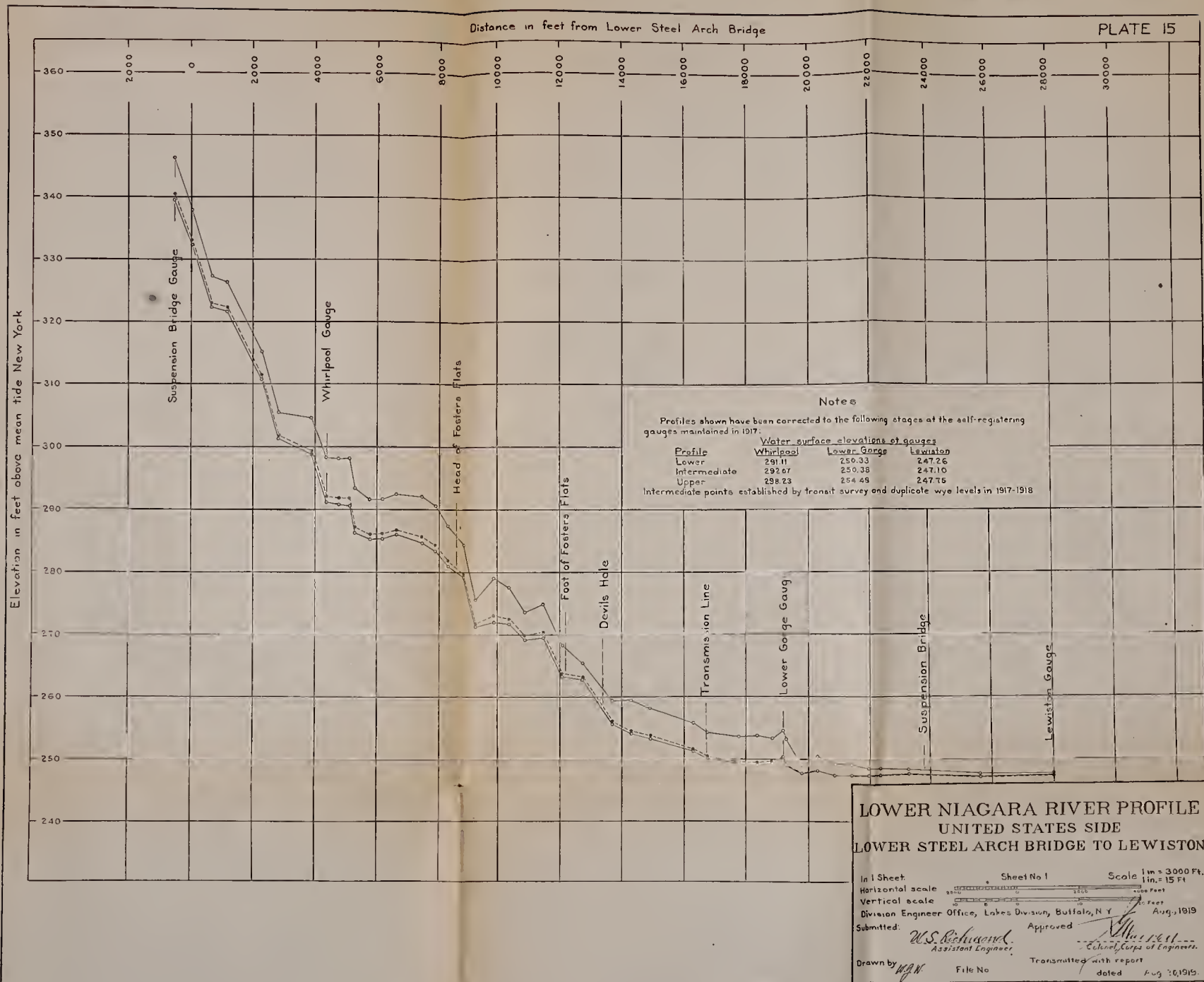
247.10

247.75

and duplicate wye levels in 1917-1918









Corps of Engineers, U. S. Army.

PLATE 16

20-11-1910

ANNUAL REPORT OF THE ENGINEER

DIVISION OF ENGINEERS

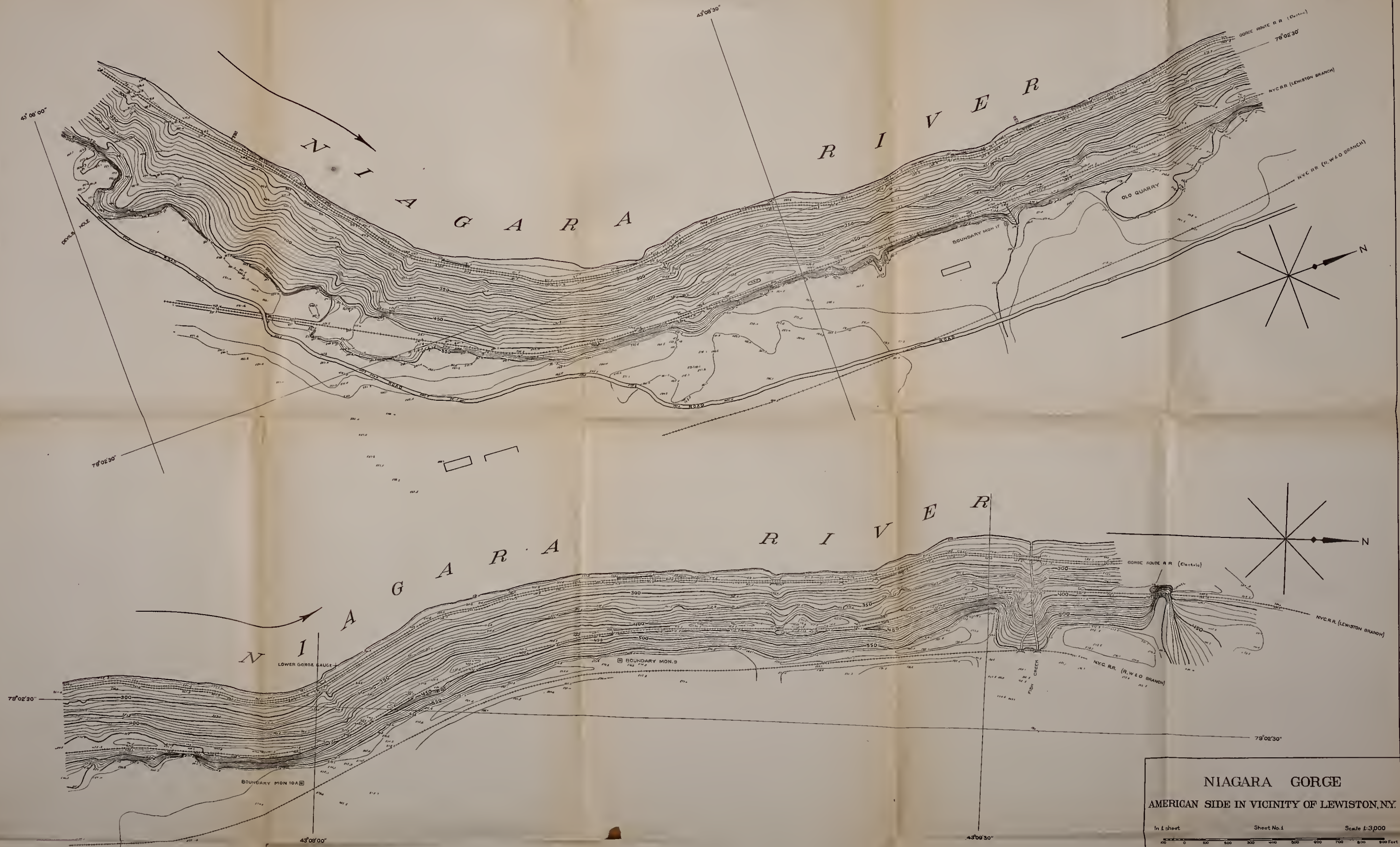
1910

1910









**NIAGARA GORGE**  
**AMERICAN SIDE IN VICINITY OF LEWISTON, N.Y.**

In 1 sheet      Sheet No. 1      Scale 1:3,000

Division Engineer Office, Lakes Division, Buffalo, N.Y.      Aug., 1919

Submitted by: *W.S. Richmond*      Approved: *W.S. Richmond*  
*Assistant Engineer*      *Colonel, Corps of Engineers*

Drawn by: *W.V.C.*      File No.      Transmitted with report  
 dated: Aug. 30, 1919





PLATE 17

Lockport d

Rochester s

Clinton lime

Clinton shal

Thorold san

Note: Taken from Folio 190 of the  
Geologic Atlas of the United States,  
U.S. Geological Survey.

Medina sand  
and shale

Whirlpool sc

TYPICAL GEOLOGIC SECTION  
OF HORSESHOE FALLS  
NIAGARA FALLS

Queenstone s

Sheet

Sheet No. 1

Scale:

0 45 90 135 FT.

Division Engineer Office, Lakes Division, Buffalo, N. Y. Aug., 1919

Submitted:

*Albert B. Jones.*  
1st. Lieut. Engineers.

Approved:

*Colonel, Corps of Engineers*

Drawn by

*W. J. W.* File No.

dated: Aug. 30, 1919.



## PLATE 17

Lockport dolomite

Rochester shale

Clinton limestone

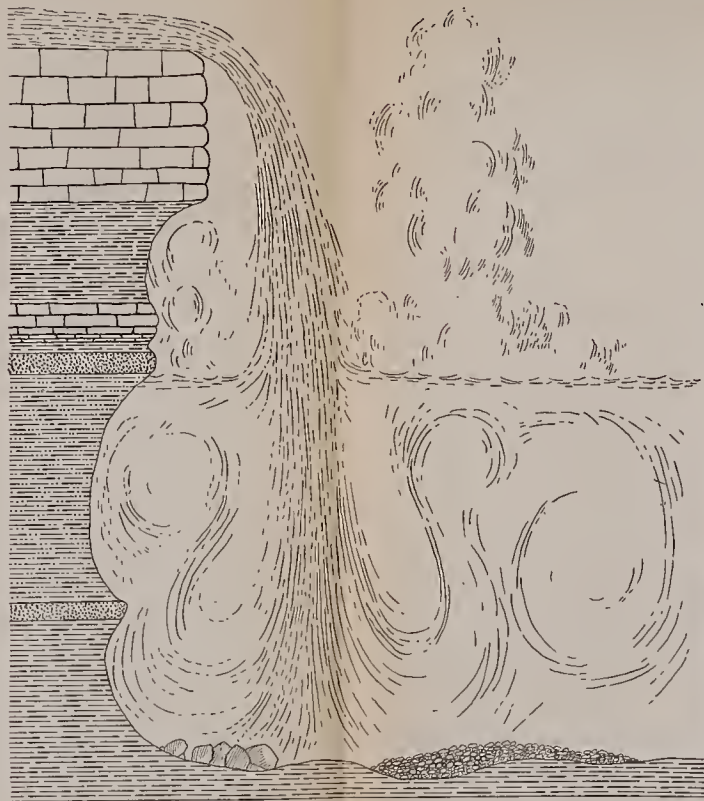
Clinton shale

Thorold sandstone

Medina sandstone  
and shale

Whirlpool sandstone

Queenstone shale



Note: Taken from Folio 190 of the  
Geologic Atlas of the United States,  
U.S. Geological Survey.

# TYPICAL GEOLOGIC SECTION OF HORSESHOE FALLS NIAGARA FALLS

In 1 Sheet

Sheet No. 1

Scale:

AS 0 AS 80 135 FT

Division Engineer Office, Lakes Division, Buffalo, N. Y. Aug., 1919

Submitted,

*Wm. B. Jones*  
1st. Lieut. Engineers

Approved,

*Wm. B. Jones*  
Colonel, Corps of Engineers

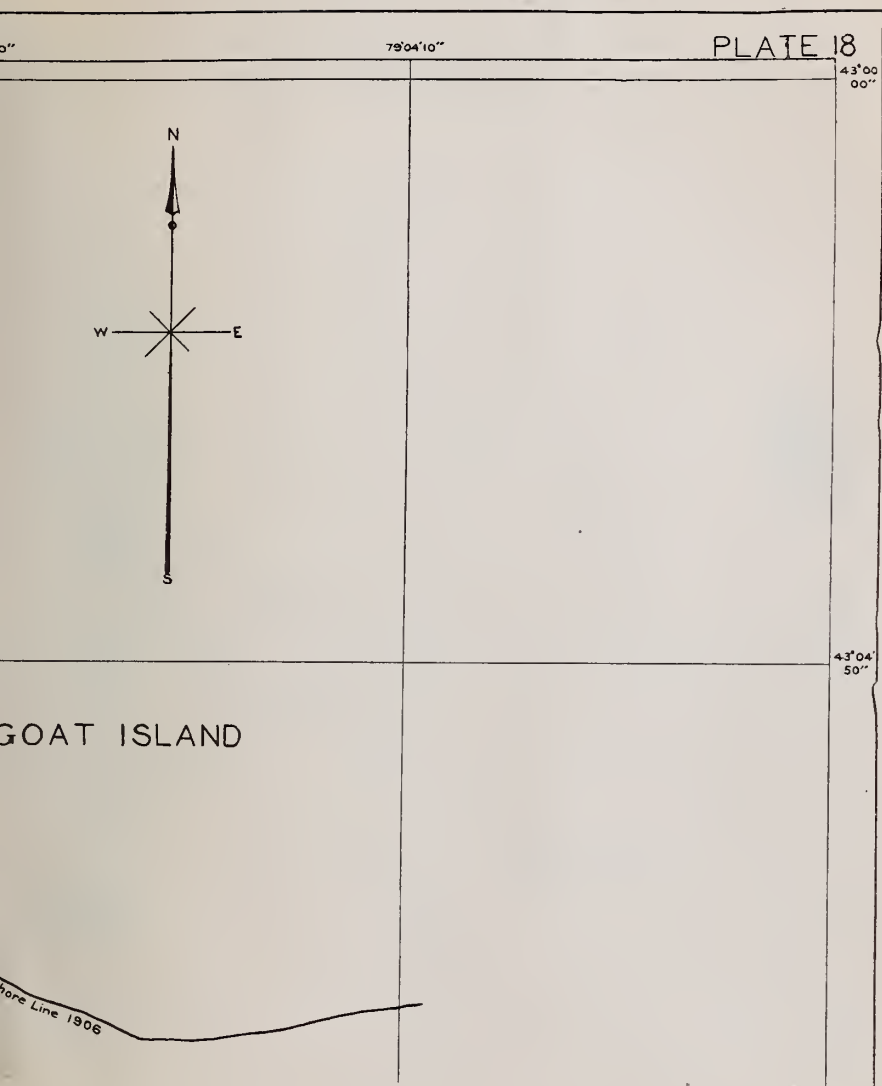
Drawn by *W. B. Jones* File No.

dated: Aug. 30, 1919.

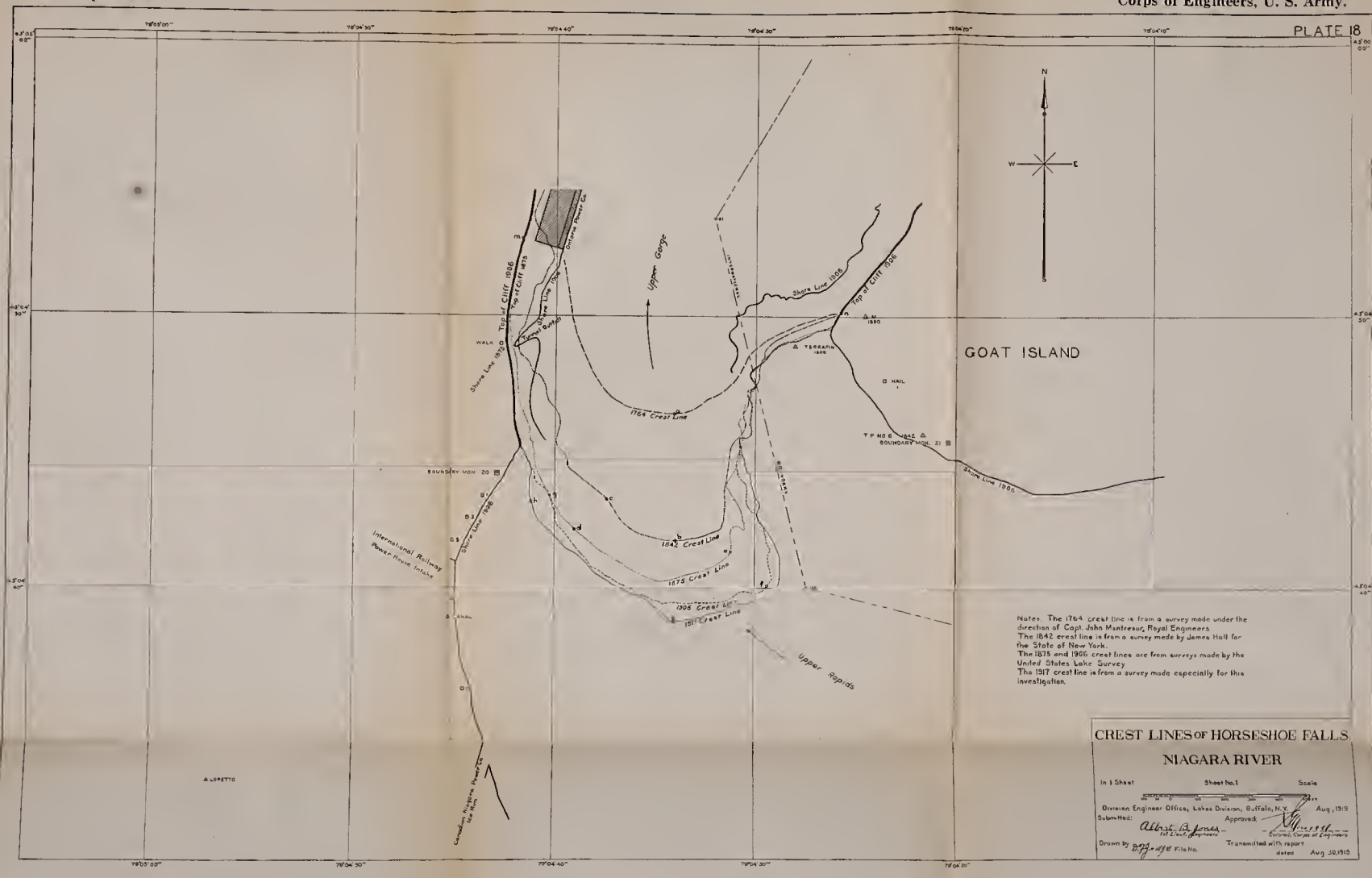




# Corps of Engineers, U. S. Army.









ers, U. S. Army.

PLATE 19



RECEIVED  
JAN 10 1918  
U. S. ARMY  
HEADQUARTERS  
WASHINGTON







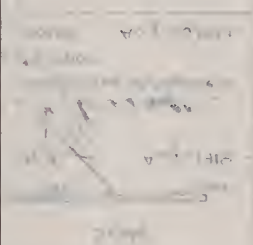
1918

1918

neers, U. S. Army.

PLATE 20

43°05'  
00"



17137 HARB

1112







Note: Geodetic coordinates are based on U.S. Standard Datum depending on D.T. No. 6. Latitude 43° 04' = 1409.6 meters. Longitude 79° 04' = 489.6 meters. Velocities are expressed in feet per second.

**CURRENT VELOCITIES**  
VICINITY OF  
**HORSESHOE FALLS, NIAGARA RIVER**

In 1 Sheet      Sheet No 1      Scale'

Division Engineer Office, Lakes Division, Buffalo, N.Y.      Aug, 1919

Submitted: *Adair B. Jones*      Approved: *V. H. ...*

1st Lieut. Engineers      Colonel, Corps of Engineers

Drawn by *...*      File No.      Transmitted with report      dated Aug. 30, 1919.



eers, U. S. Army.

PLATE 21

43°05'



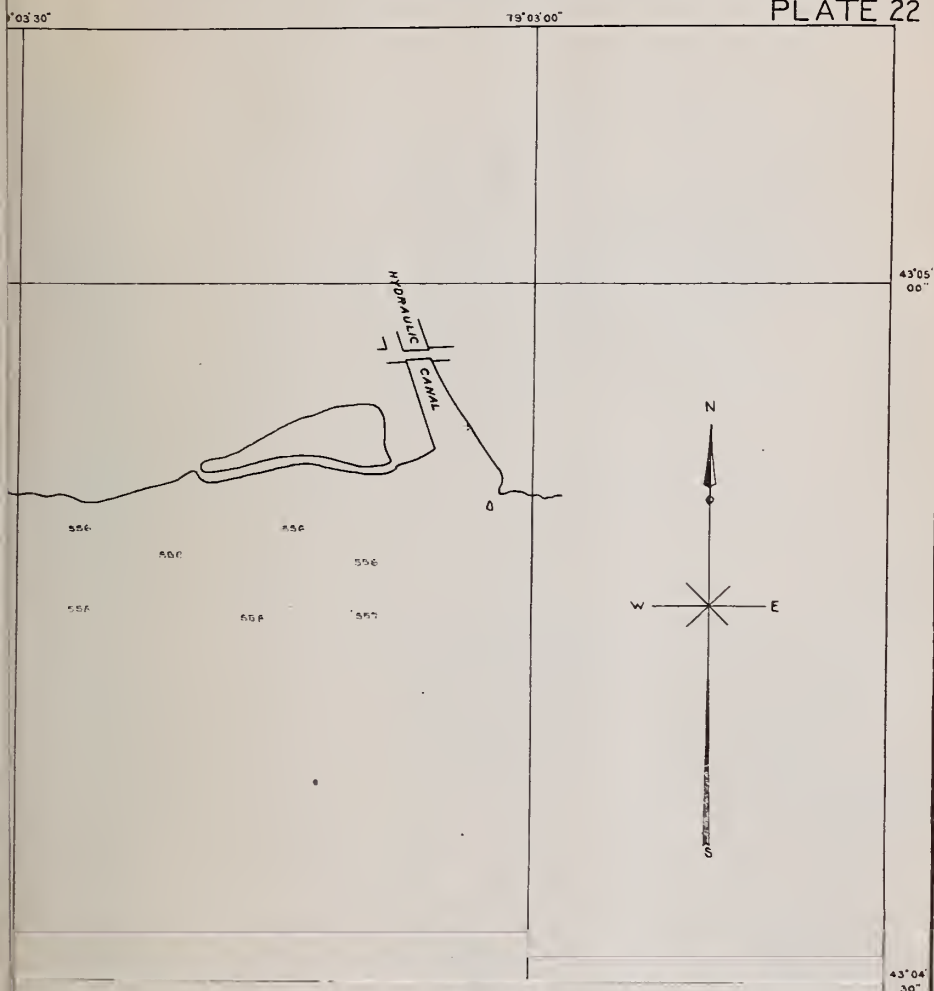






# Corps of Engineers, U. S. Army.

PLATE 22



Notes: Geodetic coordinates are based on  
U.S. Standard Datum depending on A.T.P. No 6  
Latitude 43° 04' + 14096 meters. Longitude  
79° 04' + 489.8 meters.

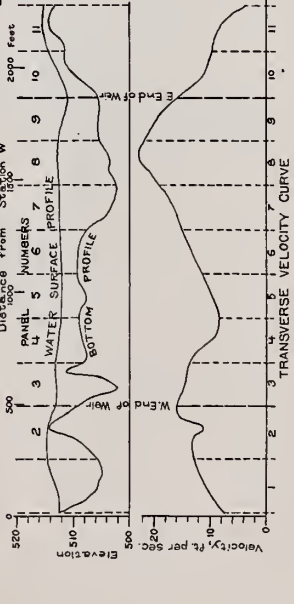
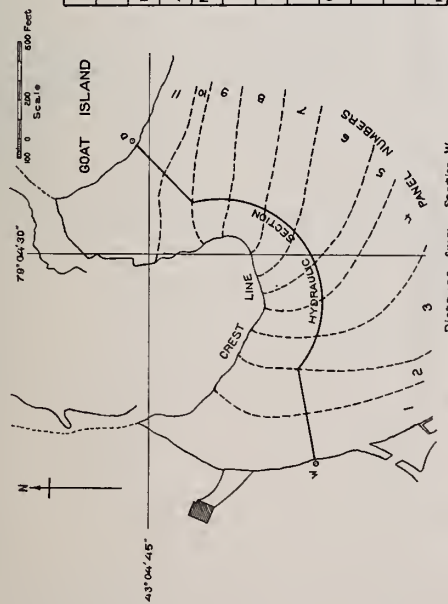








PLATE 23



Panel No.	1	2	3	4	5	6	7	8	9	10	11	Sum of Panel Numbers
Width, ft.	235	235	197	197	197	197	197	197	197	205	205	2260
Mean Depth, ft.	6.5	4.3	4.2	3.6	3.3	3.3	3.3	3.3	3.3	3.3	2.2	5.3
Area, sq. ft.	1530	1010	1280	630	710	690	1700	1700	1270	680	450	11900
Mean Velocity, ft. per sec.	10.4	13.5	14.9	10.6	9.8	13.3	16.6	21.6	19.3	11.9	8.1	14.1
Angle of Current	68°	96°	67°	78°	59°	72°	62°	67°	91°	54°	72°	—
Sine of Angle	.999	.995	.921	.378	.837	.951	.883	.999	1.000	.809	.951	—
Discharge, cu. ft. per sec.	15900	13600	17600	6600	6000	8200	24900	38600	24500	6500	3500	167600
Corr. Disch., cu. ft. per sec.	14900	12600	16500	8000	5600	7700	23300	36100	22900	6100	3300	157000
Percent of Total	9	8	10	5	4	5	15	23	15	4	2	100
Length of Crest Line, ft.	460	220	150	140	70	90	120	190	110	280	750	2580
Discharge per ft. of crest	32	57	110	57	80	85	194	190	208	22	4	61

DISCHARGE OF HORSESHOE FALLS AND RAPIDS BY FLOAT MEASUREMENTS  
 In 1 Sheet  
 Sheet No. 1  
 Scale as noted  
 Division Engineer Office, Lakes Division, Buffalo, N. Y., Aug. 1899  
 Submitted by *John L. H. Jones*  
 Drawn by *John L. H. Jones*  
 Transmitted to Engineers dated Aug. 30, 1899



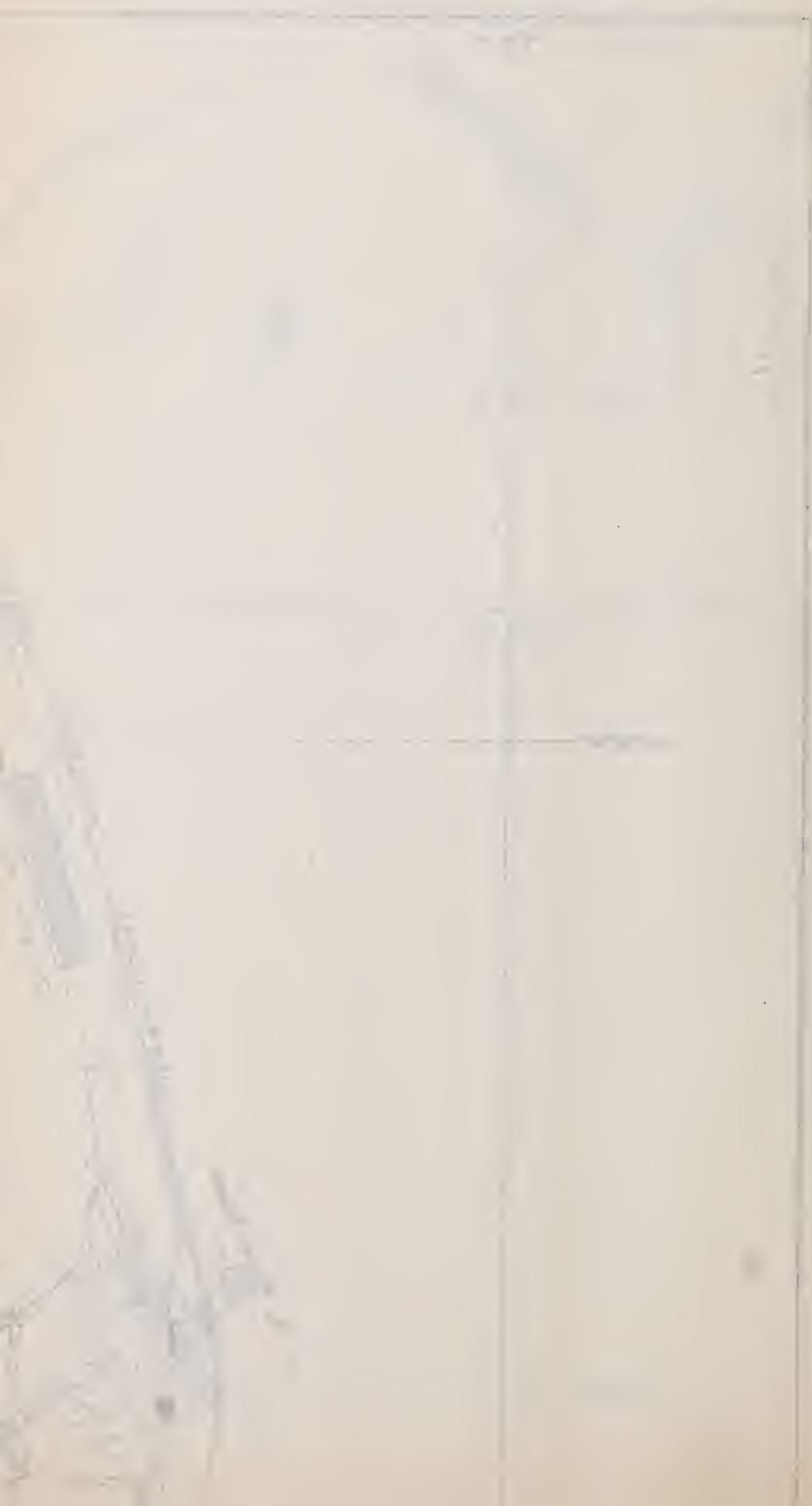
neers, U. S. Army.

# PLATE 26











Panel No.	1	2	3	4	5	6	7	8	9	10	11	Sum of Means
Width, ft.	235	235	197	197	197	197	197	197	198	205	205	2260
Mean Depth, ft.	6.2	4.7	4.5	4.3	2.6	3.2	4.2	5.4	4.8	8.1	7.1	5.0
Area, sq ft.	1460	1100	890	850	510	630	830	1070	950	1660	1460	11410
Mean Velocity normal to section, ft./sec.	12.5	10.9	7.5	7.3	5.9	6.3	7.0	7.9	8.0	14.3	13.3	10.1
Discharge, cu ft./sec.	18200	12000	6700	6200	3000	4000	5800	8400	7600	23700	19400	115000
Percent of Total	16	10	6	5	3	3	5	7	7	21	17	100
Length of Line	410	270	150	140	70	90	120	190	170	540	430	2690
Discharge per acre of cross section	44.4	44.4	44.4	44.4	44.4	44.4	48.1	44.4	44.4	44.4	48.1	44.8

# DISTRIBUTION OF FLOW THROUGH HORSESHOE RAPIDS AFTER CONSTRUCTION OF PROPOSED REMEDIAL WORK

In 1 Sheet      Sheet No.1      Scale as noted

Division Engineer-Office, Lakes Division, Buffalo, N.Y., Aug. 1919

Submitted: *Robert C. Brown*      Approved: *Robert C. Brown*      *Chief of Division*

Drawn by *J. C. File No. ---*      Transmitted with report      dated: *Aug. 19, 1919*

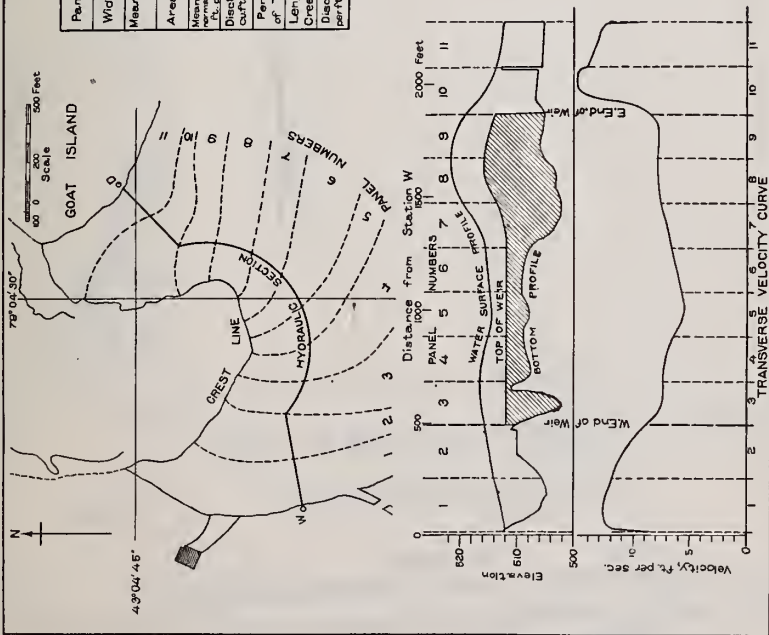
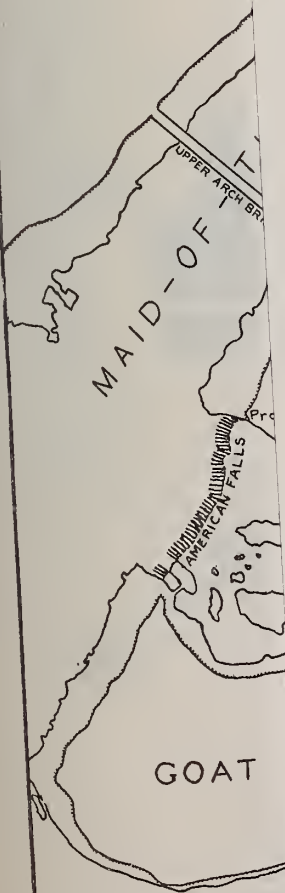




PLATE 28

N



PRESENT AMERICAN POWER PLANTS  
GOAT ISLAND NIAGARA FALLS, N. Y.

Sheet No. 1 Scale 0 1000 2000 Ft.

on Engineer Office, Lakes Division, Buffalo, N. Y. Aug., 1919

mitted: *W.S. Richardson*  
Assistant Engineer.

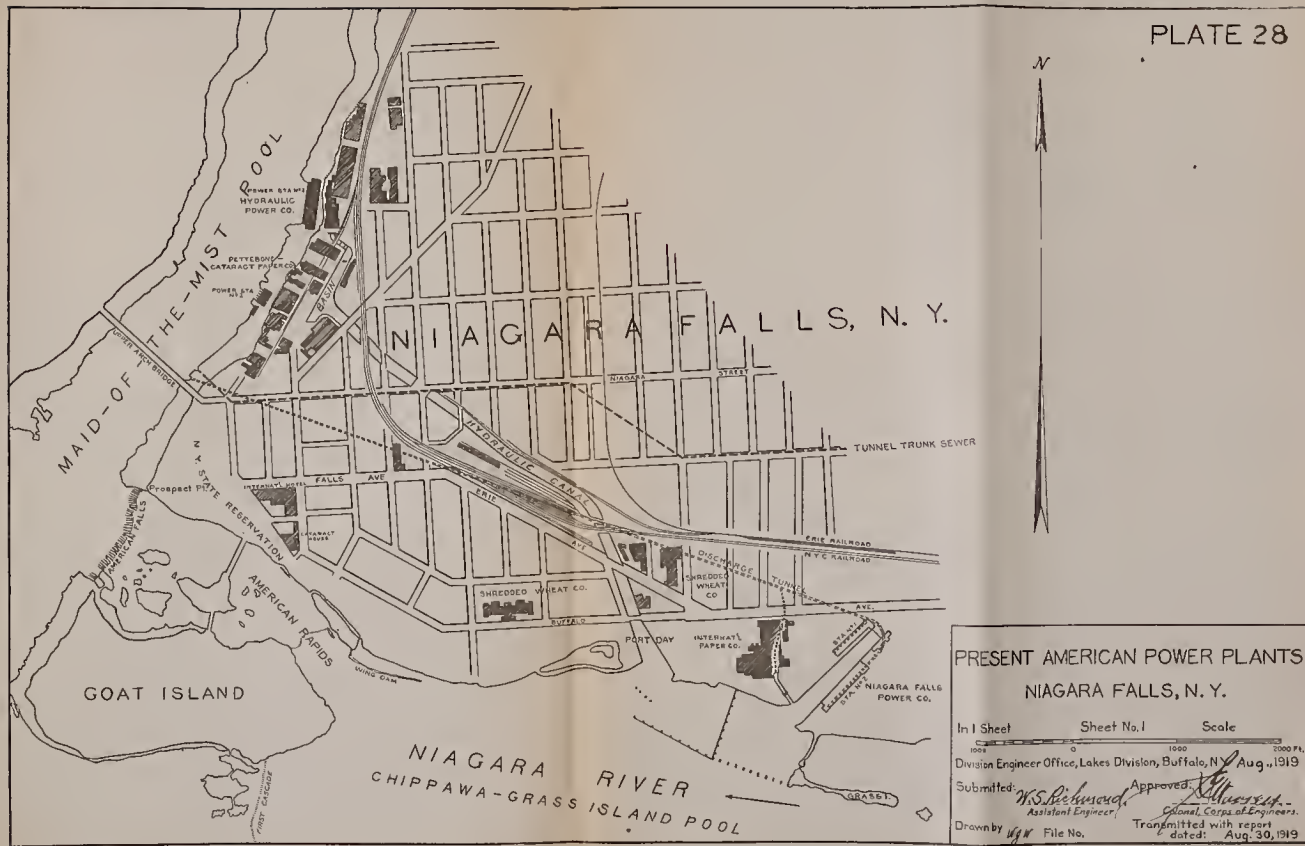
Approved: *[Signature]*  
Colonel, Corps of Engineers.

by *W.G.W.* File No.

Transmitted with report dated: Aug. 30, 1919.



PLATE 28



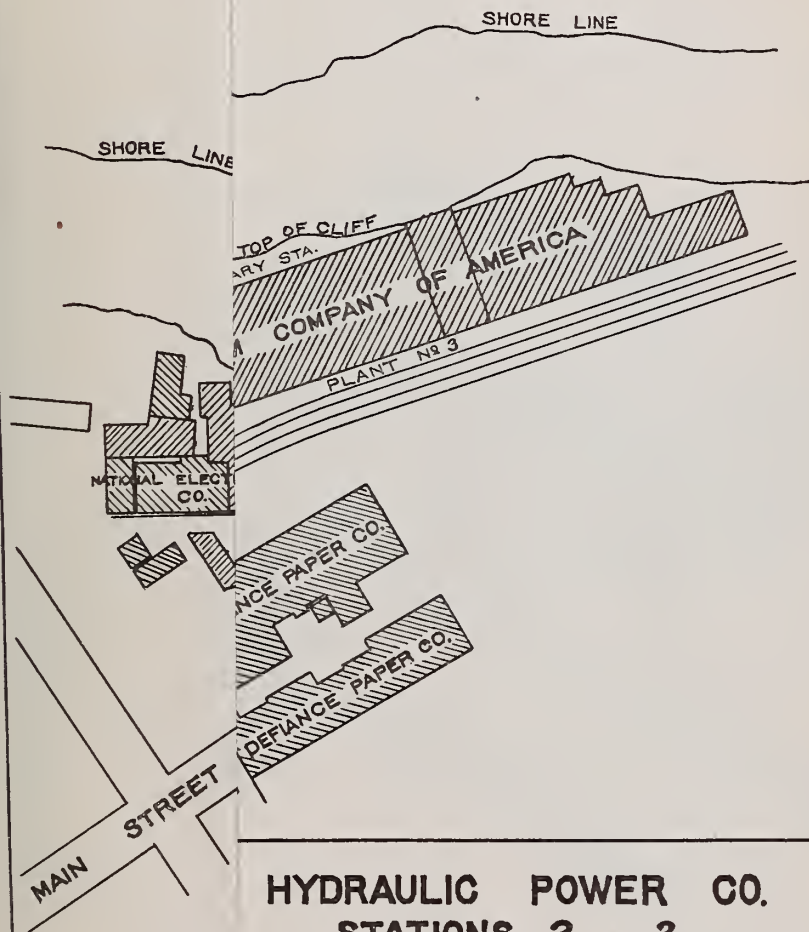
# PRESENT AMERICAN POWER PLANTS NIAGARA FALLS, N. Y.

In 1 Sheet Sheet No. 1 Scale  
 Division Engineer Office, Lakes Division, Buffalo, N. Y. Aug. 1919  
 Submitted: *W. S. Richmond* Approved: *W. S. Richmond*  
*Assistant Engineer* *Colonel, Corps of Engineers*  
 Drawn by *W. S. Richmond* File No. Transmitted with report  
 dated: Aug. 30, 1919





# PLATE 29



## HYDRAULIC POWER CO. STATIONS 2 AND 3

LOWER MILLING DISTRICT

Sheets Sheet No. 1 Scale

Engineer Office, Lakes Division, Buffalo, N.Y. Aug., 1919

mitted:

*W.S. Richardson*  
 Assistant Engineer

Approved:

*John L. ...*  
 Colonel, Corps of Engineers

vn by  
*W.C.*

File No. ---

Transmitted with report  
 dated: Aug. 30, 1919



PLATE 29

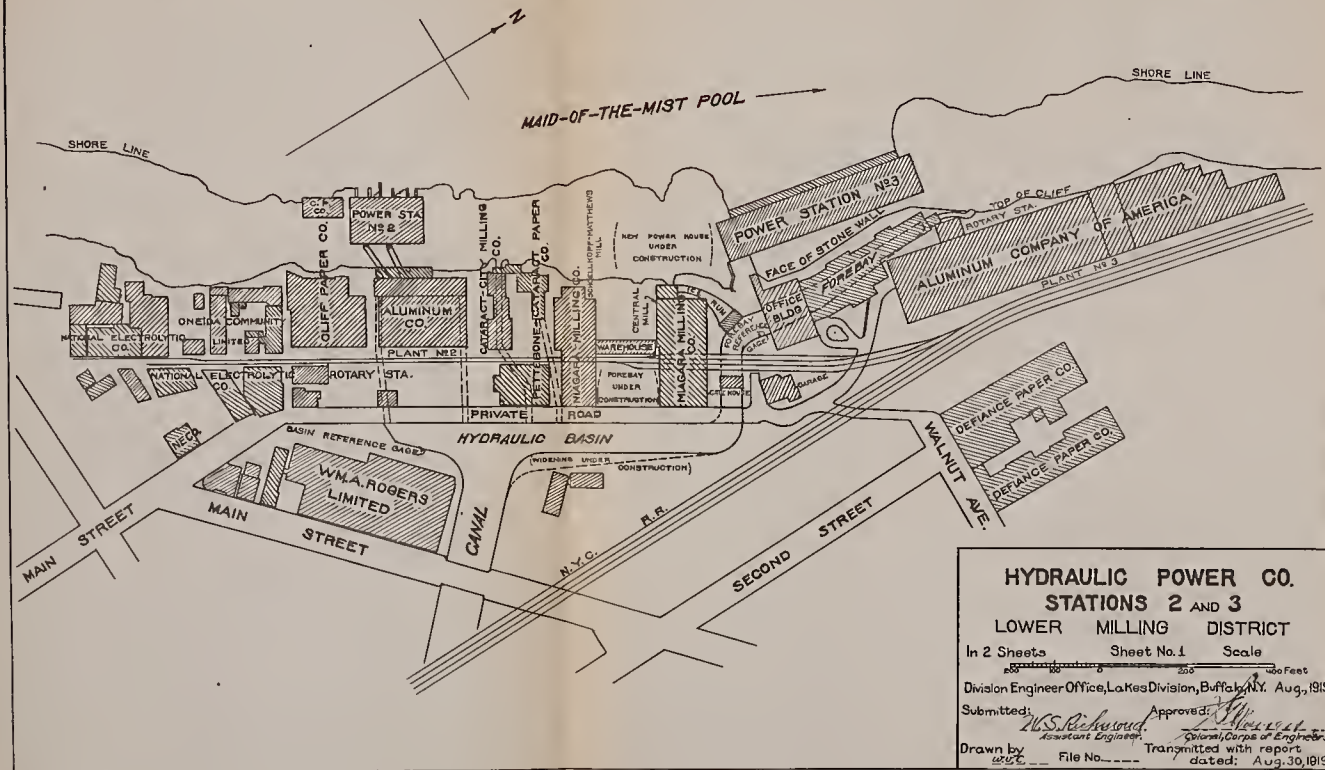
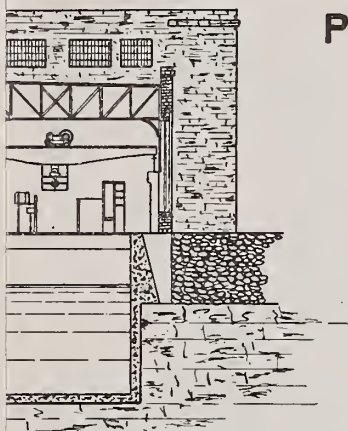




PLATE 30



HYDRAULIC POWER CO.  
STATION No 3

2 Sheets

Sheet No. 2

Scale.

30 20 10 0 30 60 Feet

Division Engineer Office, Lakes Division, Buffalo, N.Y. Aug. 1919

Submitted:

*W.S. Richmond*  
Assistant Engineer

Approved:

*J.H. Murrell*  
Colonel, Corps of Engineers

Drawn by

*W.S.C.*

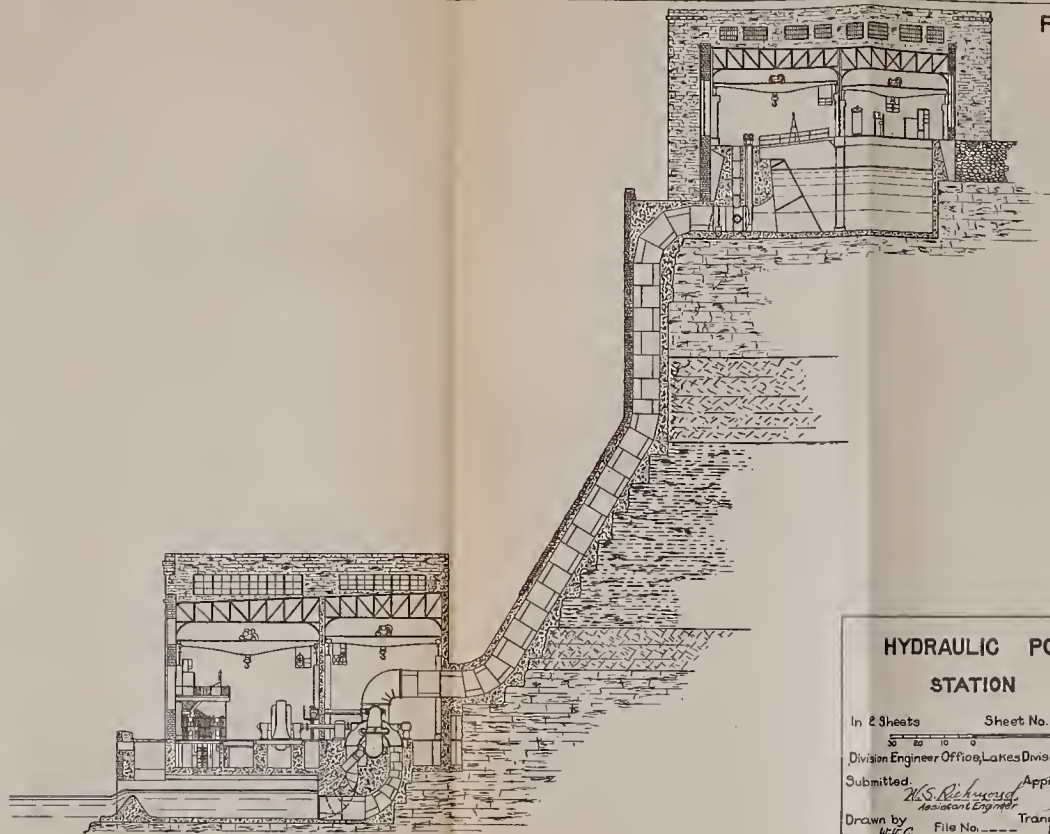
File No. \_\_\_\_\_

Transmitted with report  
dated: Aug. 30, 1919





PLATE 30



HYDRAULIC POWER CO.

STATION NO 3

In 2 Sheets Sheet No. 2 Scale.

30 20 10 0 30 40 Feet  
 Division Engineer Office, Lakes Division, Buffalo, N. Y. Aug. 1914

Submitted. *W. S. Richards* Assistant Engineer Approved. *W. S. Richards* Colonel, Corps of Engineers  
 Drawn by *W. S. Richards* File No. *12566* Transmitted with report dated. Aug. 30, 1914



PLATE 31

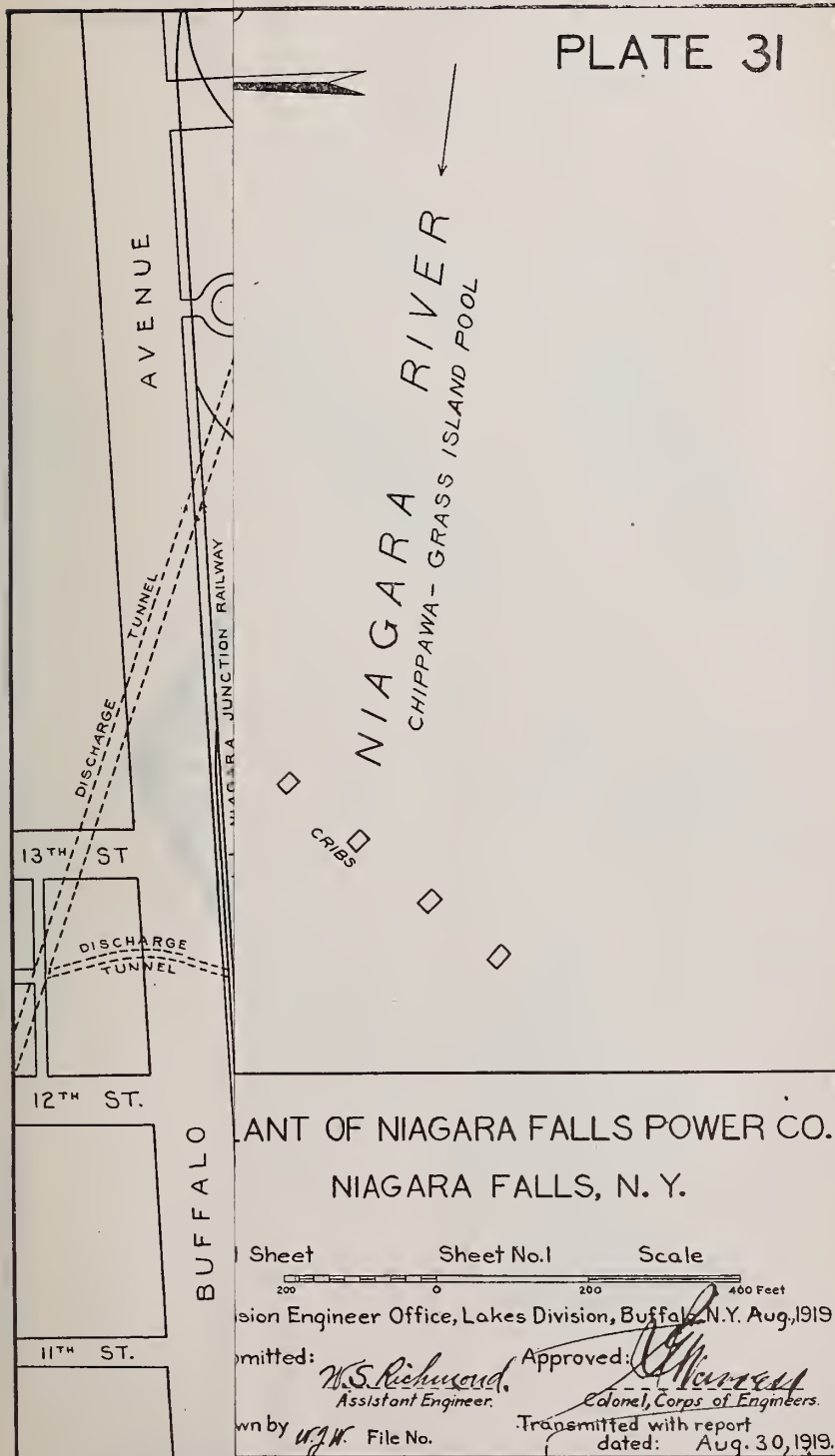




PLATE 31



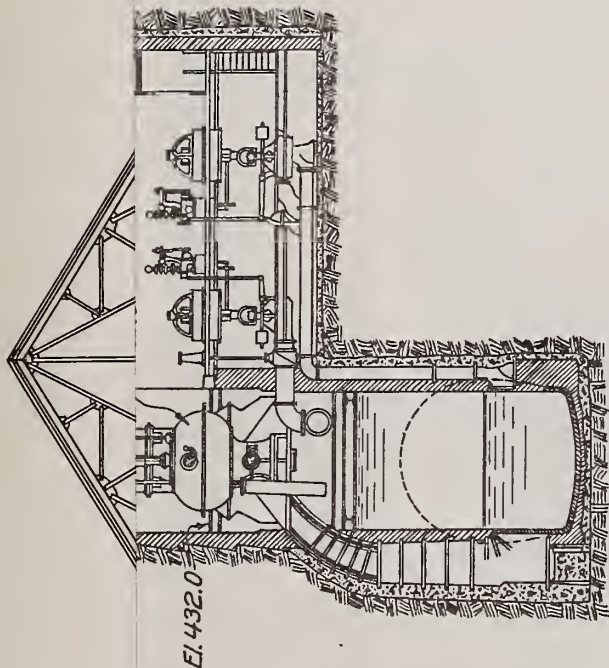
PLANT OF NIAGARA FALLS POWER CO.  
NIAGARA FALLS, N. Y.

In 1 Sheet Sheet No. 1 Scale  
200 400 600 800 1000 Feet  
Division Engineer Office, Lakes Division, Buffalo, N. Y. Aug. 1919  
Submitted: *W. S. Richardson* Approved: *W. S. Richardson*  
Assistant Engineer Colonel, Corps of Engineers  
Drawn by *W. S. Richardson* File No. Transmitted with report dated Aug. 30, 1919





PLATE 32



NIAGARA FALLS POWER CO.  
POWER HOUSE NO 2

Sheet \_\_\_\_\_ Sheet No. 1 Scale: \_\_\_\_\_  
15 10 5 0 10 39 Feet

on Engineer Office, Lakes Division, Buffalo, N. Y. Aug. 1919

mitted:

*W. S. Richmond*  
Assistant Engineer.

Approved:

*W. S. Richmond*  
Colonel, Corps of Engineers

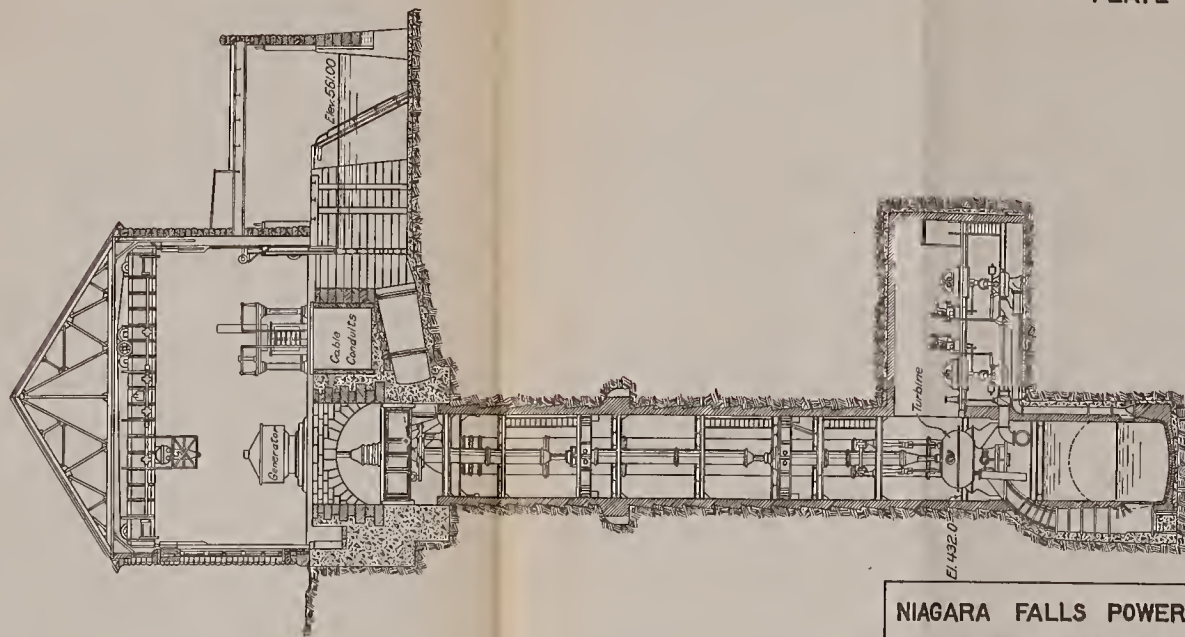
by  
W. S. C.

File No. \_\_\_\_\_

Transmitted with report  
dated: Aug. 30, 1919.



PLATE 32



NIAGARA FALLS POWER CO.  
POWER HOUSE No 2

In 1 Sheet Sheet No. 1 Scale:

10 0 10 Feet

Division Engineer Office, Lakes Division, Buffalo, N. Y. Aug. 1919

Submitted: *W. S. Richardson* Approved: *W. S. Richardson*

Assistant Engineer Chief of Engineers

Drawn by *W. S. Richardson* Transmitted with report dated: Aug. 30, 1919



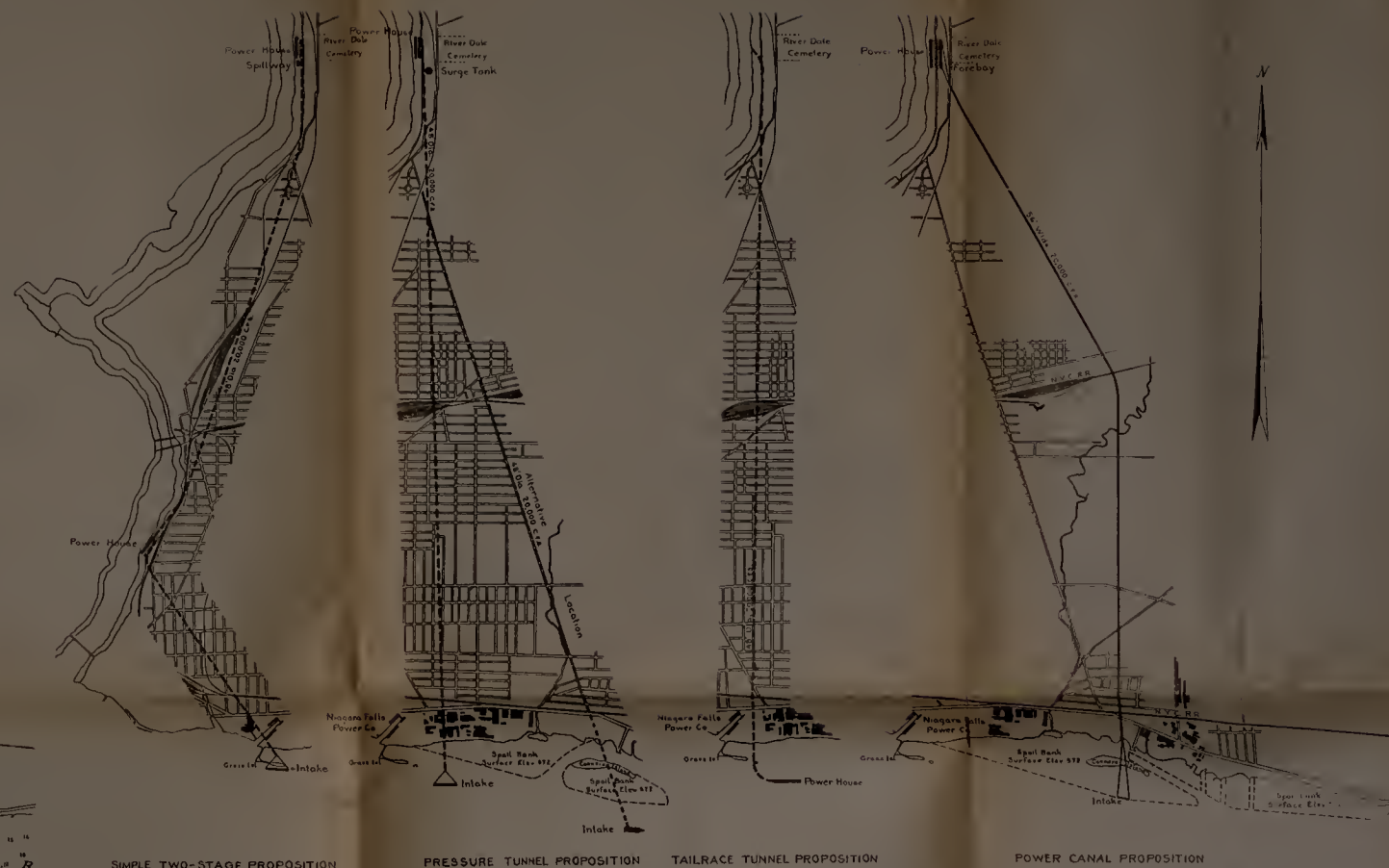
...eers, U. S. Army.

# PLATE 33







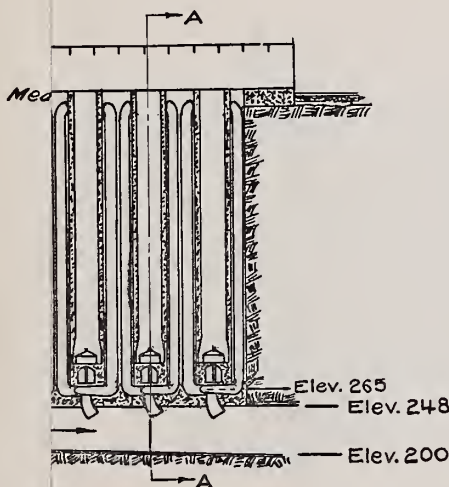


PROPOSED POWER DEVELOPMENTS  
NIAGARA FALLS, N. Y.

In Sheet Sheet No. 1 Scale  
Division Engineer Office, Lakes Division, Buffalo, N. Y. Aug. 1919  
Submitted: *W.S. Edwards* Approved: *W.S. Edwards*  
Drawn by *K.J.* File No. Transmitted with report dated Aug. 30, 1919



# PLATE 34



## SYNCH. RAILRACE TUNNEL PROPOSITION POWER HOUSE

Sheet. Sheet No. 1. Scales as noted.

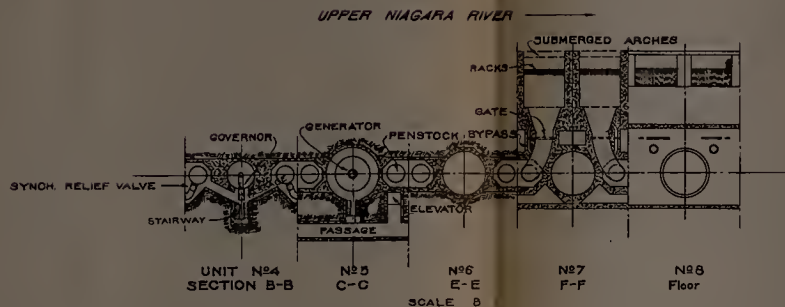
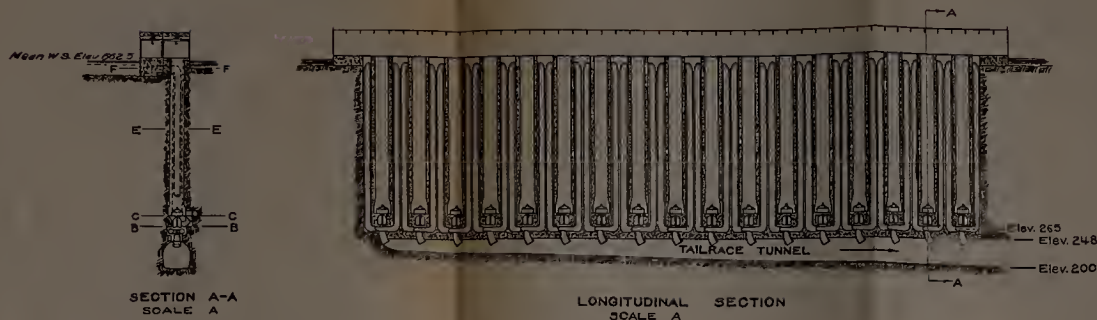
A 0 50 100 150 200 250 300 350 400 Feet  
B 25 0 25 50 75 100 125 Feet

on Engineer Office, Lakes Division, Buffalo, N.Y. Aug., 1919

mitted: *W.S. Richmond* Assistant Engineer. Approved: *Colonel, Corps of Engineers*

by *W.S.C.* File No. Transmitted with report dated: Aug. 30, 1919.





# TAILRACE TUNNEL PROPOSITION POWER HOUSE

In 1 Sheet. Sheet No. 1. Scales as noted.

Division Engineer Office, Lakes Division, Buffalo, N.Y. Aug., 1919

Submitted by: *W.S. Robinson* Assistant Engineer. Approved: *[Signature]* Division Engineer.

Drawn by: *[Signature]* File No. --- Transmitted with report dated: Aug. 30, 1919.





PLATE 35

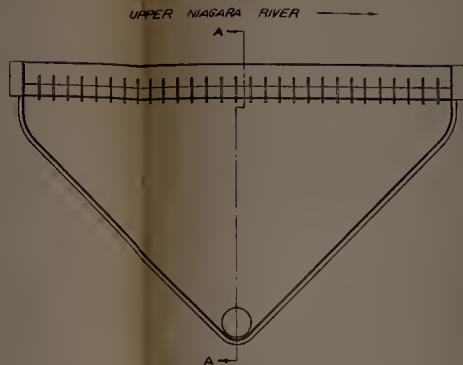


PRESSURE TUNNEL PROPOSITION  
INTAKE

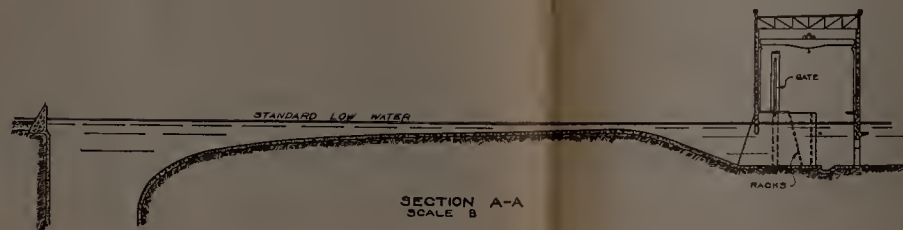
4 Sheets. Sheet No. 1. Scales as noted.  
A 0 50 100 150 200 250 300 350 400 Feet  
B 25 0 25 50 75 100 125 Feet  
Division Engineer Office, Lakes Division, Buffalo, N.Y. Aug., 1919  
Transmitted:  
by *W.S. Richmond* Approved: *W.S. Richmond*  
Assistant Engineer. Colonel, Corps of Engineers  
File No. Transmitted with report  
dated: Aug. 30, 1919



PLATE 35



PLAN OF GRASS ISLAND INTAKE  
SCALE A



## PRESSURE TUNNEL PROPOSITION INTAKE

In 4 Sheets. Sheet No. 1. Scales as noted.

Division Engineer Office, Lakes Division, Buffalo, N.Y. Aug., 1919

Submitted: *M. S. Braden* Approved: *W. H. Wood*  
Assistant Engineer Colonel, Corps of Engineers

Drawn by *W. H. Wood* Transmitted with report dated: Aug. 30, 1919  
--- S. E. C. File No. ---



PLATE 36

PRESSURE TUNNEL PROPOSITION  
DIFFERENTIAL SURGE TANK

4 Sheets.

Sheet No. 2.

Scale

0 50 100 150 200 250 300 350 400 Feet

Division Engineer Office, Lakes Division, Buffalo, N.Y. Aug., 1919

Submitted:

*W.S. Richmond*  
Assistant Engineer.

Approved:

*W.S. Richmond*  
Colonel, Corps of Engineers.

Drawn by

*W.S.C.*

File No. -----

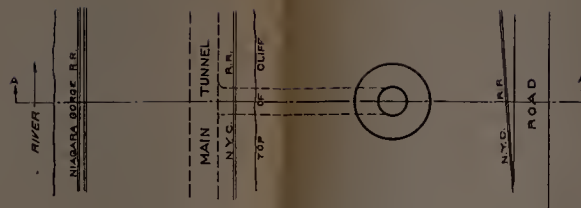
Transmitted with report

dated: Aug. 30, 1919.

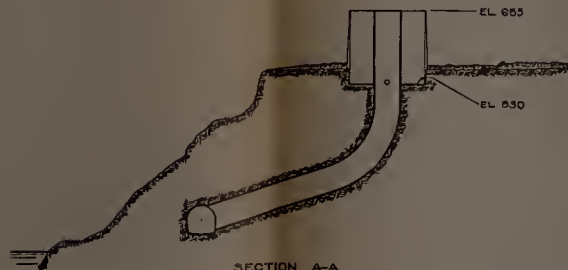




PLATE 36



PLAN OF DIFFERENTIAL SURGE TANK



SECTION A-A

# PRESSURE TUNNEL PROPOSITION DIFFERENTIAL SURGE TANK

In 4 Sheets. Sheet No. 2. Scale

0 50 100 150 200 250 300 350 400 Feet

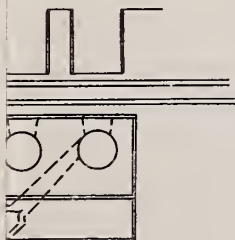
Division Engineer Office, Lakes Division, Buffalo, N.Y. Aug., 1919

Submitted: *W.S. Richmond* Approved: *W.S. Richmond*  
Assistant Engineer. Colonel, Corps of Engineers.

Drawn by *W.C.* File No. *---* Transmitted with report dated: Aug. 30, 1919.



## PLATE 37



# PRESSURE TUNNEL PROPOSITION POWER HOUSE

Sheets.

Sheet No.3.

Scale:

50 25 0 50 100 150 200 250 Feet

on Engineer Office, Lakes Division, Buffalo, N.Y. Aug., 1919

itted:

*W.S. Richmond*  
Assistant Engineer.

Approved:

*W. H. Telford*  
Colonel, Corps of Engineersby *W.S.C.*

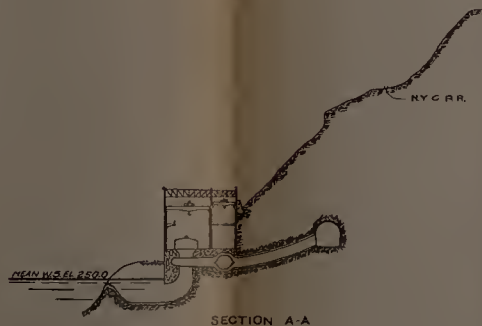
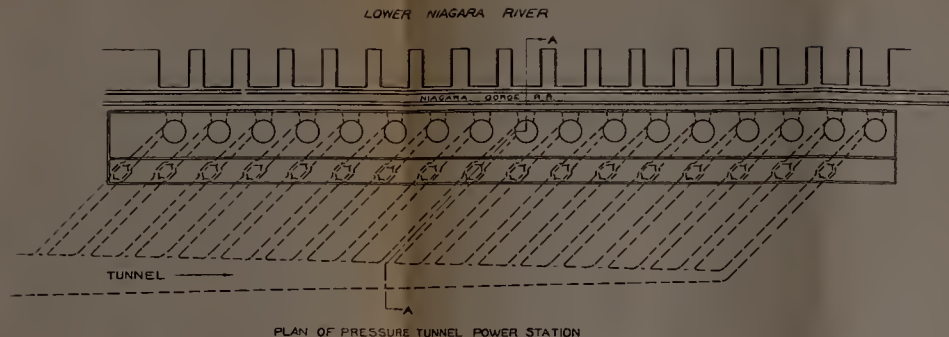
File No. \_\_\_\_\_

Transmitted with report

dated: Aug. 30, 1919.



PLATE 37



# PRESSURE TUNNEL PROPOSITION POWER HOUSE

In 4 Sheets. Sheet No. 3. Scale:

50 100 150 200 250 Feet

Division Engineer's Office, Lakes Division, Buffalo, N.Y. Aug. 1919

Submitted by *W.S. Edwards* Approved: *John T. McEl*  
Assistant Engineer Colonel, Corps of Engineers

Drawn by *W.S.* Transmitted with report dated: Aug. 30, 1919.





PLATE 38



PRESSURE TUNNEL PROPOSITION  
ALTERNATIVE DESIGN  
MID-RIVER INTAKE  
LOCATION SOUTH OF CONNERS ISLAND

4 Sheets. Sheet No. 4. Scales as noted

A 0 25 50 100 150 200 250 Feet  
B 25 0 25 50 75 100 125 feet

Division Engineer Office, Lakes Division, Buffalo, N.Y. Aug., 1919

Submitted:

*W.S. Richmond.*  
Assistant Engineer.

Approved:

*W.S. Richmond.*  
Colonel, Corps of Engineers.

Drawn by

*W.S.C.*

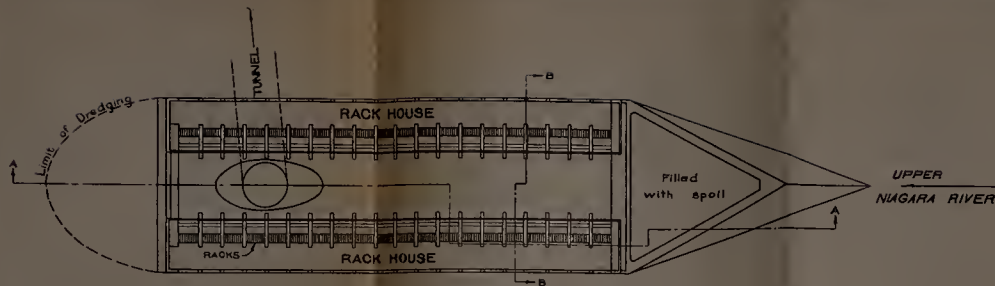
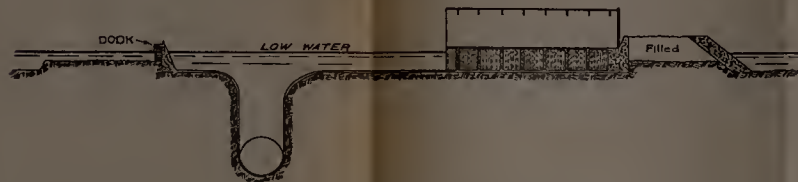
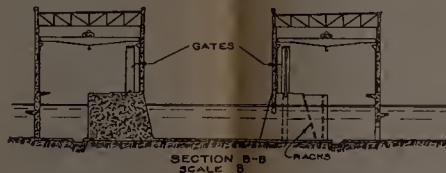
File No. -----

Transmitted with report

dated: Aug. 30, 1919



PLATE 38

PLAN OF TUNNEL INTAKE  
SCALE ASECTION A-A  
SCALE ASECTION B-B  
SCALE B

## PRESSURE TUNNEL PROPOSITION

ALTERNATIVE DESIGN  
MID-RIVER INTAKE

LOCATION SOUTH OF CONNERS ISLAND

In 4 Sheets.

Sheet No. 4.

Scales as noted

A 0' 25' 50' 75' 100' 125' 150' 175' 200' 225' 250' 275' 300' 325' 350' 375' 400' 425' 450' 475' 500' 525' 550' 575' 600' 625' 650' 675' 700' 725' 750' 775' 800' 825' 850' 875' 900' 925' 950' 975' 1000'

Division Engineer Office, Lakes Division, Buffalo, N.Y. Aug., 1919

Submitted

Approved:

W. S. Babcock

J. E. R. E. J.

Assistant Engineer

Colonel, Corps of Engineers

Drawn by

File No.

Transmitted with report

dated: Aug. 30, 1919



PLATE 39

111





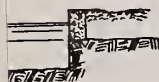


— 2 —

# PLATE 40

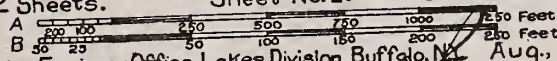


CHES



## POWER CANAL PROPOSITION INTAKE

2 Sheets. Sheet No. 1. Scales as noted



Division Engineer Office, Lakes Division, Buffalo, N.Y. Aug., 1919

mitted:

*W.S. Richmond*  
Assistant Engineer.

Approved:

*W.S. Richmond*  
Colonel, Corps of Engineers.

wn by

*W.S.C.* File No. \_\_\_\_\_

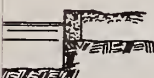
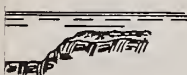
Transmitted with report  
(dated: Aug. 30, 1919)



# PLATE 40



CHES



## POWER CANAL PROPOSITION INTAKE

2 Sheets. Sheet No. 1. Scales as noted

A 250 100 500 750 1000 1250 Feet  
B 50 25 50 100 150 200 250 Feet

Division Engineer Office, Lakes Division, Buffalo, N.Y. Aug., 1919

mitted:

*W.S. Richmond*  
Assistant Engineer.

Approved:

*W.S. Richmond*  
Colonel, Corps of Engineers.

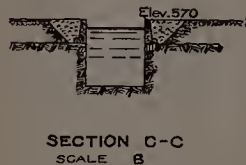
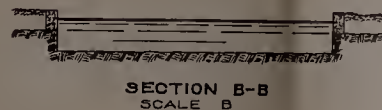
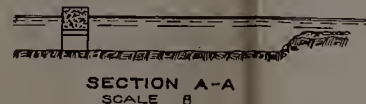
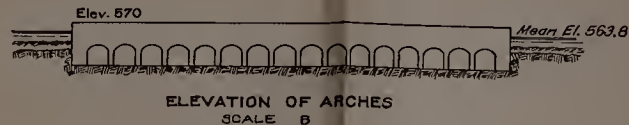
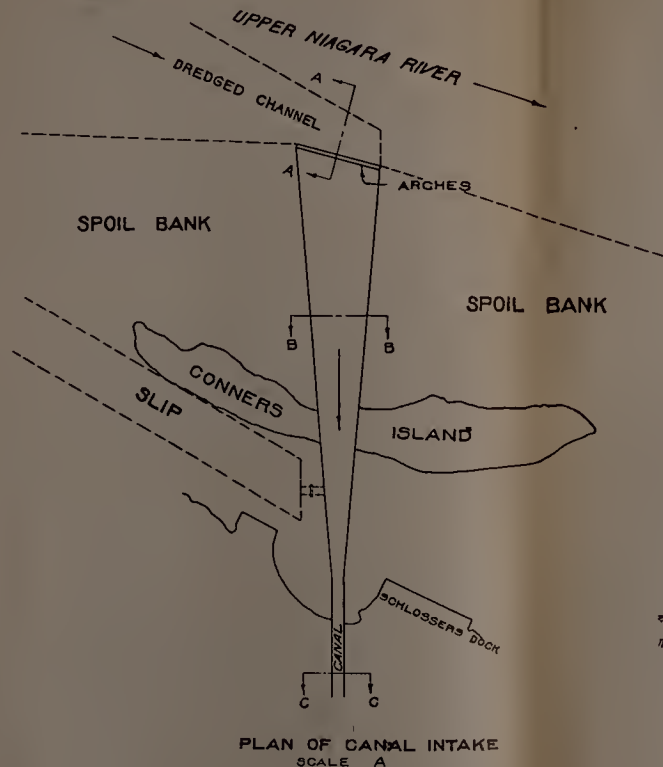
vn by

— *W.S.C.* — File No. —

Transmitted with report

(dated: Aug. 30, 1919)





## POWER CANAL PROPOSITION INTAKE

In 2 Sheets. Sheet No. 1. Scales as noted

Scale	Horizontal	Vertical
A	1" = 50'	1" = 10'
B	1" = 100'	1" = 10'

Division Engineer Office, Lakes Division, Buffalo, N.Y. Aug., 1919

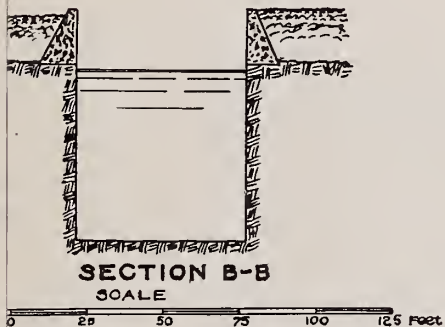
Submitted: *W.S. Richmond* Assistant Engineer. Approved: *W.S. Richmond* Colonel, Corps of Engineers.

Drawn by: *W.S.C.* File No. *100-1000* Transmitted with report dated: Aug. 30, 1919





PLATE 41



POWER CANAL PROPOSITION  
FOREBAY AND POWER HOUSE

2 Sheets

Sheet No. 2

Scales as noted

Engineer Office, Lakes Division, Buffalo, N.Y. Aug., 1919

mitted:

*W. S. Richmond*  
Assistant Engineer.

Approved:

*W. S. Richmond*  
Colonel, Corps of Engineers

n by

*W. S. C.*

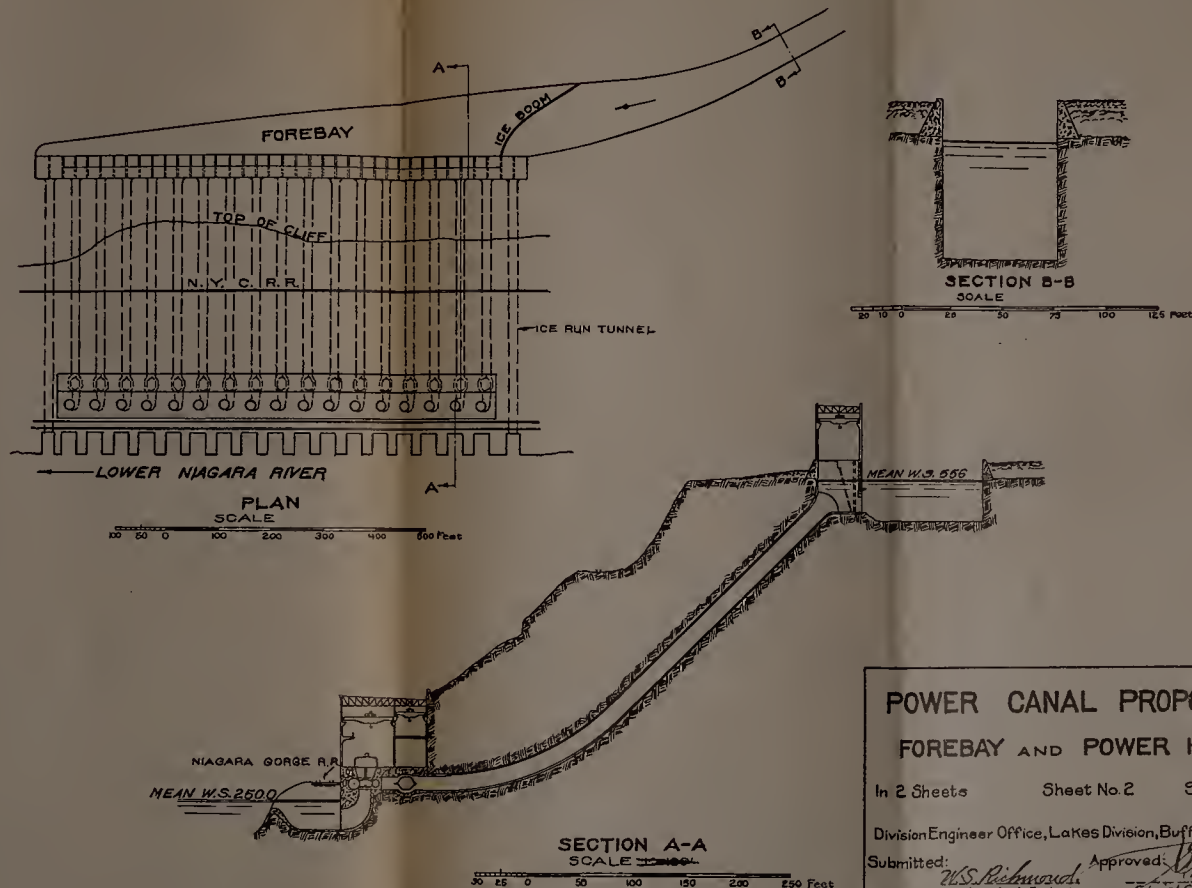
File No. ---

Transmitted with report

dated: Aug. 30, 1919



PLATE 41



POWER CANAL PROPOSITION  
FOREBAY AND POWER HOUSE

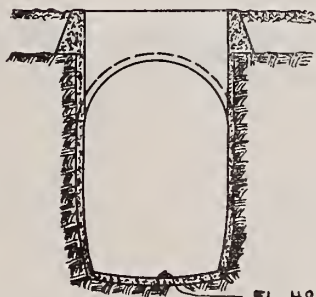
In 2 Sheets Sheet No. 2 Scales as noted

Division Engineer Office, Lakes Division, Buffalo, N.Y. Aug., 1919

Submitted: *W.S. Richmond* Assistant Engineer. Approved: *W.S. Richmond* Colonel, Corps of Engineers.  
Drawn by: *W.C.* File No. --- Transmitted with report dated: Aug. 30, 1919



PLATE 42



EL. 493

SECTION B-B

COMPOUND TWO-STAGE PROPOSITION  
TUNNEL INTAKE AT PORT DAY

Sheets Sheet No. 1 Scales as noted

Engineer Office, Lakes Division, Buffalo, N.Y. Aug., 1919

mitted:

*W.S. Richmond*  
Assistant Engineer.

Approved:

*Chas. E. ...*  
Colonel, Corps of Engineers

n by

File No. ---

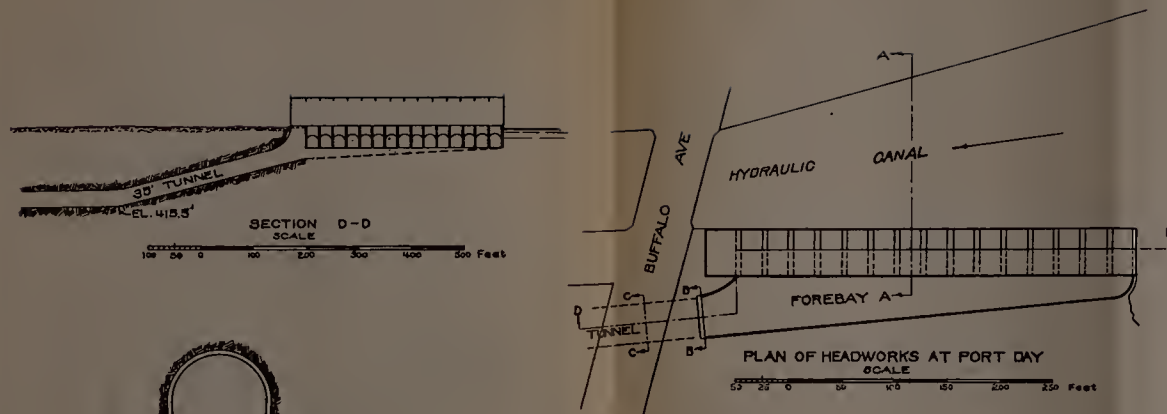
Transmitted with report

dated: Aug. 30, 1919

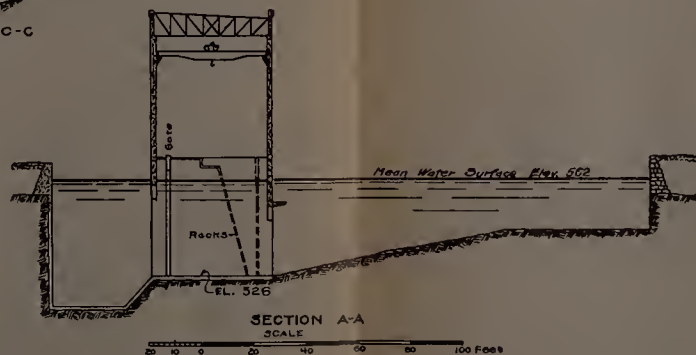




## PLATE 42



SECTION C-C



SECTION B-B

EL. 493

### COMPOUND TWO-STAGE PROPOSITION TUNNEL INTAKE AT PORT DAY

In 4 Sheets Sheet No. 1 Scales as noted

Division Engineer Office, Lakes Division, Buffalo, N. Y. Aug., 1913

Submitted: *W. S. Richardson* Approved: *W. S. Richardson*  
Assistant Engineer. Colonel, Corps of EngineersDrawn by: *W. S. Richardson* Transmitted with report dated: Aug. 30, 1913  
File No. ---



old surface

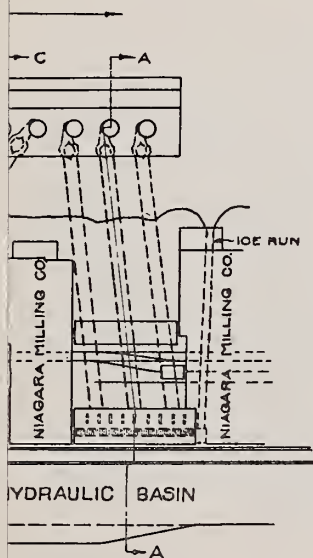


old surface



old surface

PLATE 43



R STATION

REV. 560  
A  
B  
C  
D  
E  
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H  
I  
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IF  
IG  
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II  
IJ  
IK  
IL  
IM  
IN  
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IW  
IX  
IY  
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JE  
JF  
JG  
JH  
JI  
JJ  
JK  
JL  
JM  
JN  
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JP  
JQ  
JR  
JS  
JT  
JU  
JV  
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COMPOUND TWO-STAGE PROPOSITION  
UPPER STATION  
WITHOUT DOWN-RIVER CONNECTIONS

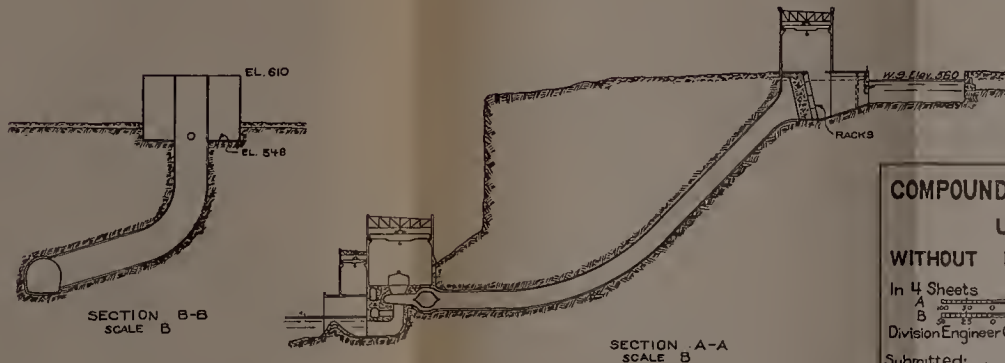
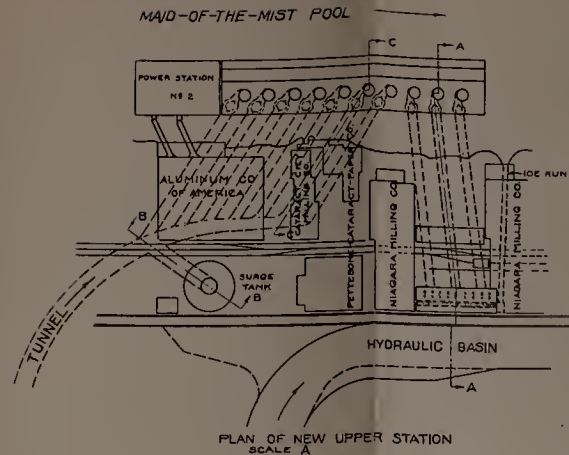
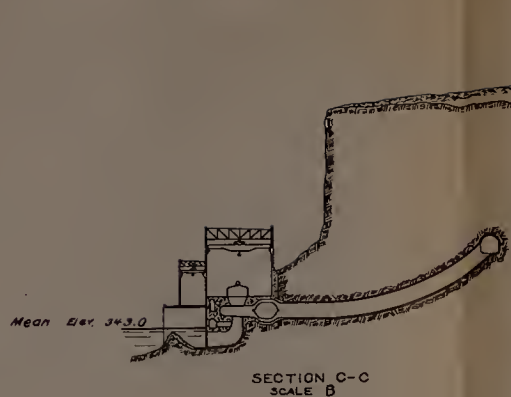
4 Sheets Sheet No. 2 Scales as noted

A 100 30 0 100 200 300 400 500 Feet  
B 50 25 0 50 100 150 200 250 Feet  
Division Engineer Office, Lakes Division, Buffalo, N.Y. Aug., 1919

mitted: *N.S. Richardson* Approved: *Colonel, Corps of Engineers*  
Assistant Engineer  
by *W.C.* File No. --- Transmitted with report dated: Aug. 30, 1919



PLATE 43



COMPOUND TWO-STAGE PROPOSITION  
UPPER STATION

WITHOUT DOWN-RIVER CONNECTIONS

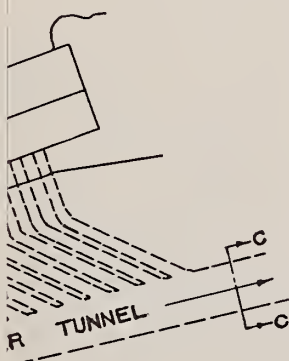
In 4 Sheets Sheet No. 2 Scales as noted

Division Engineer Office, Lakes Division, Buffalo, N.Y. Aug., 1913

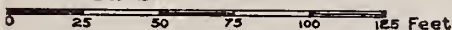
Submitted by *W.S. Richardson* Approved: *W.S. Richardson*  
Assistant Engineer Civil Engineer  
Drawn by *W.S.C.* File No. --- Transmitted with report dated: Aug. 30, 1913



PLATE 44



SECTION C-C  
SCALE



COMPOUND TWO-STAGE PROPOSITION  
UPPER STATIONS

Mean W.S. Elev.

WITH DOWN-RIVER CONNECTIONS

4 Sheets

Sheet No. 3

Scales as noted

Division Engineer Office, Lakes Division, Buffalo, N.Y. Aug., 1919

Submitted:

*W.S. Richardson*  
Assistant Engineer.

Approved:

*Chas. H. Moore*  
Colonel, Corps of Engineers

Drawn by

*W.S.C.*

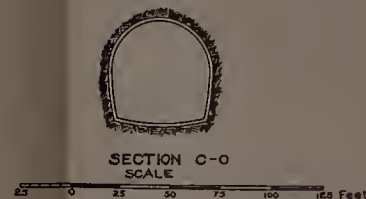
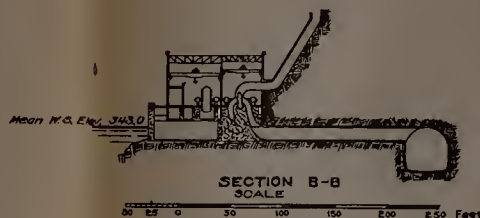
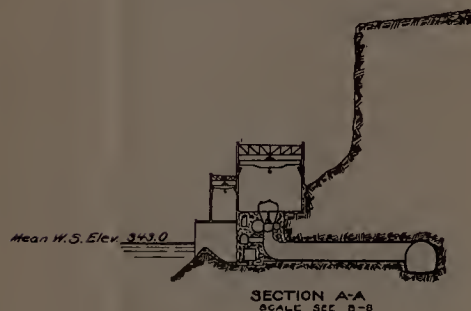
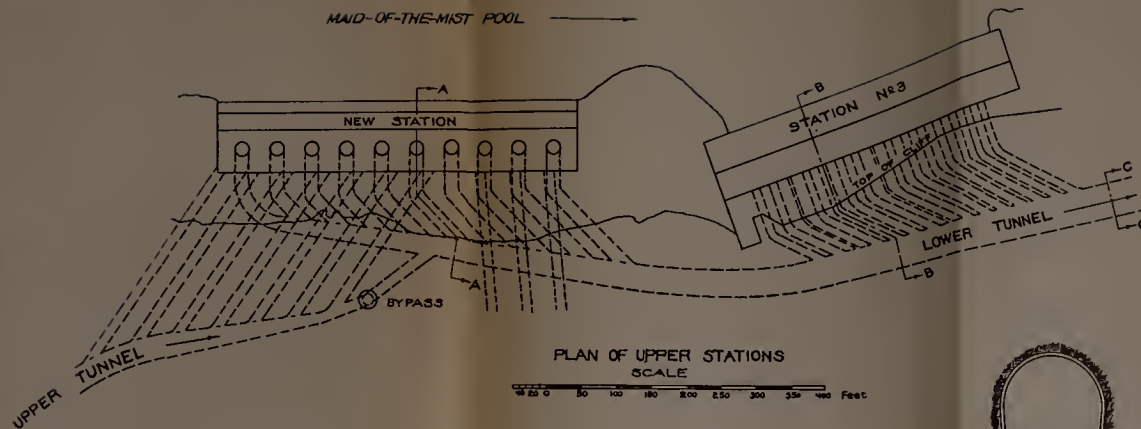
File No. \_\_\_\_\_

Transmitted with report

Dated: Aug. 30, 1919







# COMPOUND TWO-STAGE PROPOSITION UPPER STATIONS

WITH DOWN-RIVER CONNECTIONS

In 4 Sheets Sheet No. 3 Scales as noted

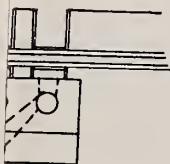
Division Engineer Office, Lakes Division, Buffalo, N. Y. Aug., 1919

Submitted: *W.S. Reinhardt* Approved: *W.S. Reinhardt*  
Assistant Engineer. Colonel, Corps of Engineers.

Drawn by *W.S.C.* File No. *---* Transmitted with report Dated: Aug. 30, 1919.



PLATE 45



COMPOUND TWO-STAGE PROPOSITION

LOWER STATION

MEAN W.S.

4 Sheets Sheet No. 4 Scales as noted

A 0 25 50 100 150 200 250 300 350 400 Feet  
B 0 25 50 100 150 200 250 Feet  
Division Engineer Office, Lakes Division, Buffalo, N.Y. Aug., 1919

mitted:

*W. S. Richmond*  
Assistant Engineer

Approved:

*W. S. Richmond*  
Colonel, Corps of Engineers

wn by

*W. S. G.*

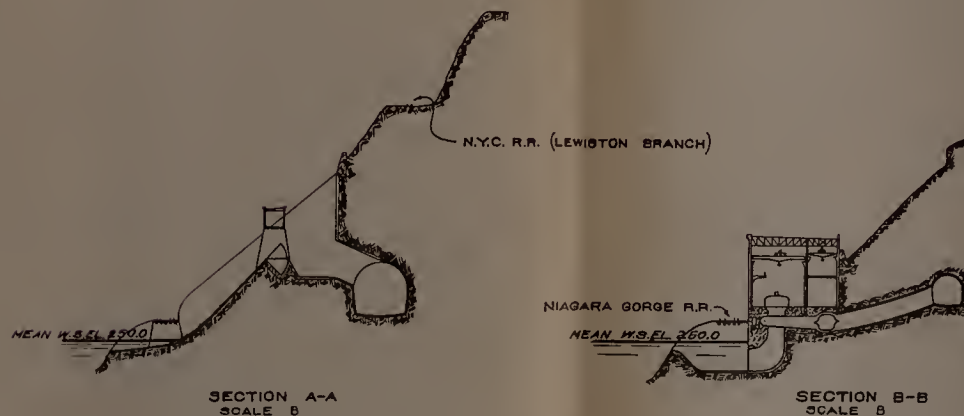
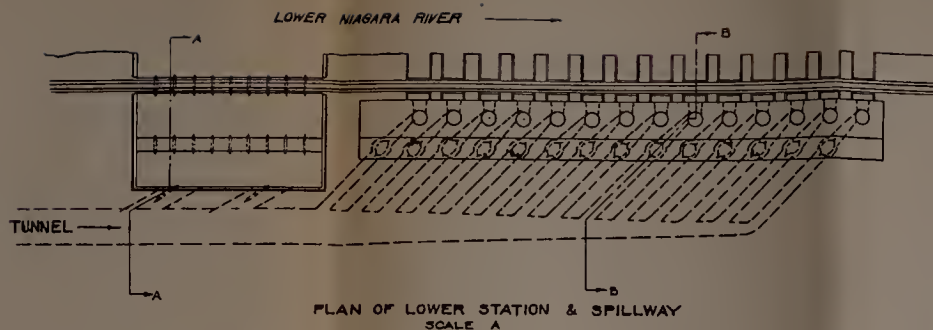
File No. ----

Transmitted with report

dated: Aug., 30, 1919



## PLATE 45



## COMPOUND TWO-STAGE PROPOSITION

## LOWER STATION

In 4 Sheets Sheet No. 4 Scales as noted  
 A 0 25 50 75 100 125 150 175 200 Feet  
 B 0 50 100 150 200 Feet  
 Division Engineer Office, Lakes Division, Buffalo, N.Y. Aug., 1919  
 Submitted: *W.S. McLaughlin* Approved: *W.S. McLaughlin*  
*Assistant Engineer* *Chief of Engineers*  
 Drawn by *W.C.G.* File No. --- Transmitted with report  
 Dated: Aug. 30, 1919





PLATE 46

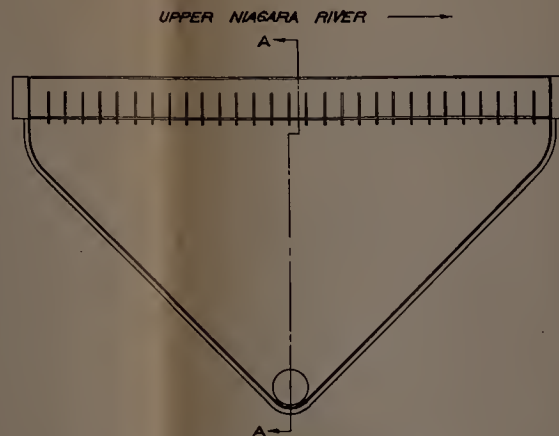


AMPLE TWO-STAGE PROPOSITION  
INTAKE

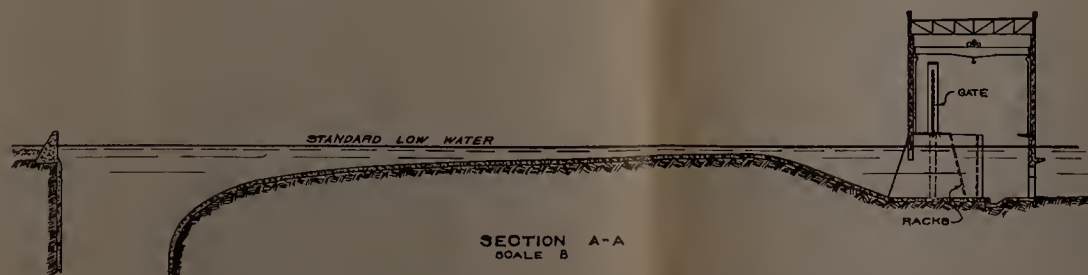
Sheets Sheet No. 1 Scales as noted  
A 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 Feet  
B 0 25 50 75 100 125 Feet  
on Engineer Office, Lakes Division, Buffalo, N. Y. Aug., 1919  
mitted: *W. S. Richmond* Approved: *W. S. Richmond*  
Assistant Engineer. Colonel, Corps of Engineers  
vn by *W. S. C.* File No. --- Transmitted with report  
dated: Aug. 30, 1919.



## PLATE 46



PLAN OF GRASS ISLAND INTAKE  
SCALE A



SECTION A-A  
SCALE B

### SIMPLE TWO-STAGE PROPOSITION INTAKE

In 3 Sheets Sheet No. 1 Scales as noted

Division Engineer Office, Lakes Division, Buffalo, N.Y. Aug., 1919

Submitted: *W.S. Richardson*, Assistant Engineer  
Approved: *W.H. ...*, Colonel, Corps of Engineers  
Transmitted with report  
Drawn by: *W.C. ...* File No. --- dated: Aug. 30, 1919



PLATE 47

LEVEL →

GORGE R.R.

AMPLE TWO-STAGE PROPOSITION  
UPPER STATION

Sheets Sheet No. 2 Scales as noted

0 50 100 150 200 250 300 350 400 Feet  
0 25 50 100 150 200 250 Feet

on Engineer Office, Lakes Division, Buffalo, N.Y. Aug., 1919

mitted:

*W. S. Richmond*  
Assistant Engineer.

Approved:

*W. S. Richmond*  
Colonel, Corps of Engineers

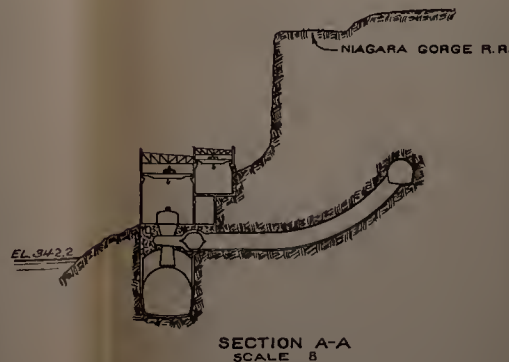
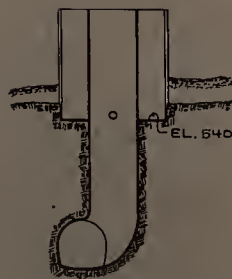
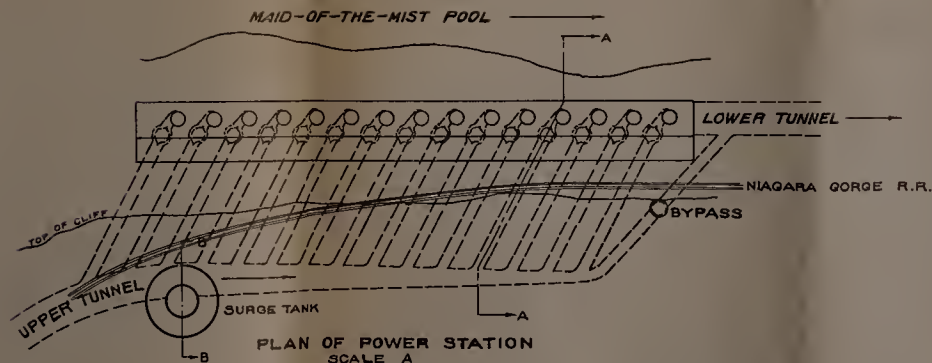
n by  
*W. S. Richmond*

File No. ---

Transmitted with report  
dated: Aug. 30, 1919.



PLATE 47



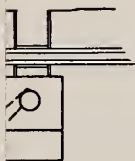
SIMPLE TWO-STAGE PROPOSITION  
UPPER STATION

In 3 Sheets Sheet No. 2 Scales as noted  
 A 0 50 100 150 200 250 300 Feet  
 B 0 50 100 150 200 250 Feet  
 Division Engineer Office, Lakes Division, Buffalo, N.Y. Aug. 1919  
 Submitted: *M. S. Robinson* Approved: *W. H. H. H.*  
 Assistant Engineer. Colonel, Corps of Engineers  
 Drawn by *W. H. H.* File No. Transmitted with report dated: Aug. 30, 1919.





PLATE 48

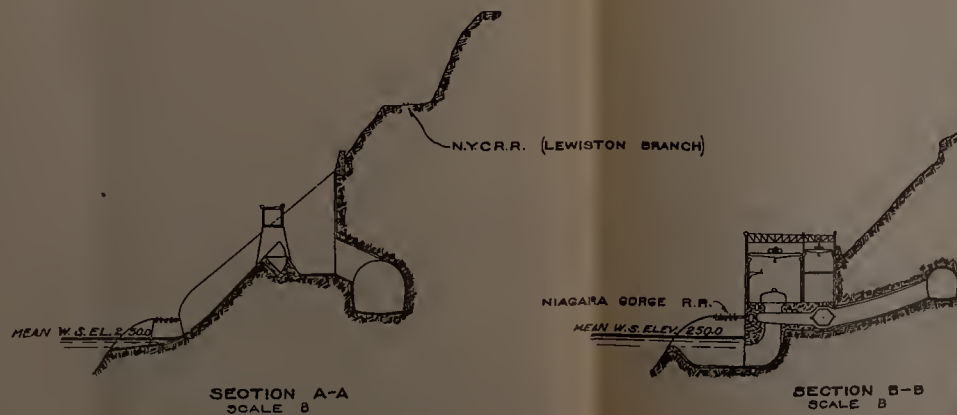
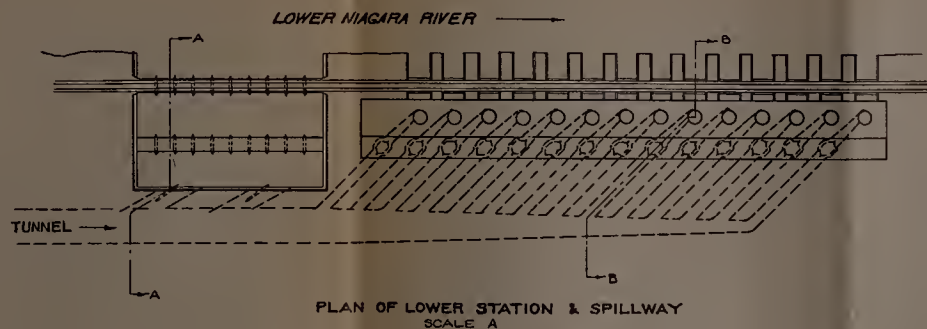


AMPLE TWO-STAGE PROPOSITION  
LOWER STATION

MEAN W.S. E

Sheets Sheet No. 3 Scales as noted  
0 50 100 150 200 250 300 350 400 Feet  
0 25 50 75 100 125 150 175 200 Feet  
on Engineer Office, Lakes Division, Buffalo, N.Y. Aug., 1919  
mitted: *W.S. Richmond* Approved: *W.S. Richmond*  
Assistant Engineer. Colonel, Corps of Engineers  
n by *W.S. Richmond* File No. --- Transmitted with report  
dated: Aug. 30, 1919





# SIMPLE TWO-STAGE PROPOSITION LOWER STATION

In 3 Sheets Sheet No. 3 Scales as noted  
 A 0 50 100 150 200 250 300 Feet  
 B 0 50 100 150 200 250 Feet  
 Division Engineer Office, Lakes Division, Buffalo, N.Y. Aug. 1919  
 Submitted: *W.S. Robinson* Approved: *W.S. Robinson*  
 Assistant Engineer Colonel, Corps of Engineers  
 Drawn by *W.S. Robinson* Transmitted with report dated: Aug. 30, 1919  
 File No. ---



PLATE 49







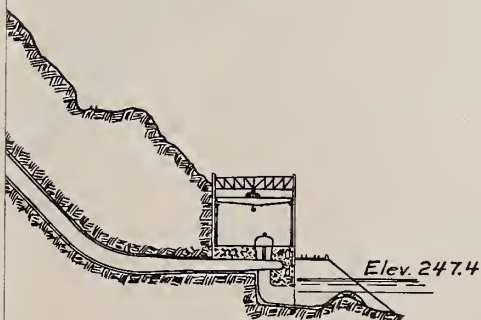




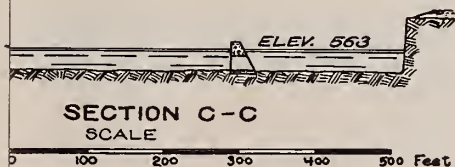
PLATE 50



SECTION B-B  
SCALE A



SECTION A-A  
SCALE A



SHIP CANAL PROPOSITION  
POWER PLANT

2 Sheets Sheet No. 1 Scales as noted

Proposed by Engineer Office, Lakes Division, Buffalo, N.Y. Aug., 1919

Submitted:

*W.S. Richmond*  
Assistant Engineer.

Approved:

*W.S. Richmond*  
Colonel, Corps of Engineers.

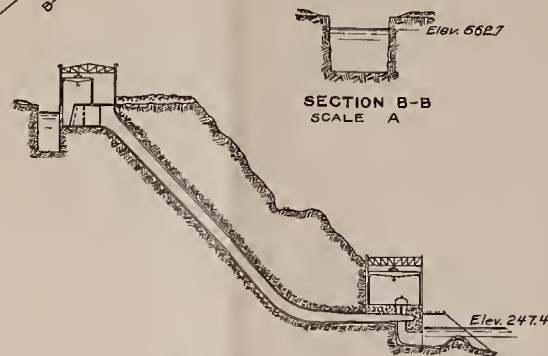
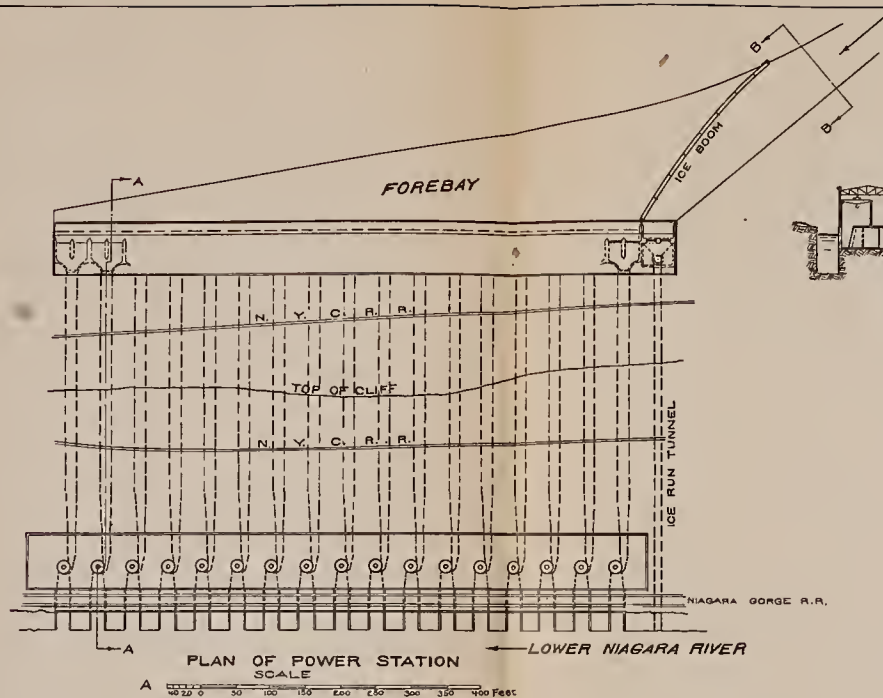
Drawn by

*W.S.C.* File No. \_\_\_\_\_

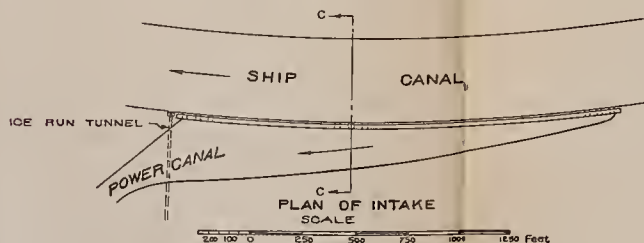
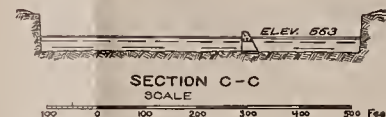
Transmitted with report  
dated: Aug. 30, 1919



PLATE 50



SECTION A-A  
SCALE A



## SHIP CANAL PROPOSITION POWER PLANT

In 2 Sheets Sheet No 1 Scales as noted

Division Engineer Office, Lakes Division, Buffalo, N.Y. Aug, 1911

Submitted: *W.S. Polakowski* Assistant Engineer Approved: *W.S. Polakowski* Colonel, Corps of Engineers

Drawn by *W.S.C.* File No. Transmitted with report dated: Aug. 30, 1919





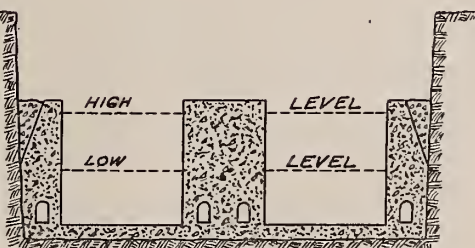
# PLATE 51

Shore



EL. 500

EL. 500



SECTION A-A  
SCALE B

## SHIP CANAL PROPOSITION LOCKS

Sheets Sheet No.2 Scales as noted

1000 500 0 500 1000 1500 2000 Feet  
50 25 0 50 100 150 200 250 Feet

Engineer Office, Lakes Division, Buffalo, N.Y. Aug., 1919

mitted:

*W. S. Richmond*  
Assistant Engineer.

Approved:

*Colonel*  
Colonel, Corps of Engineers.

by

W. S. C. File No. - - -

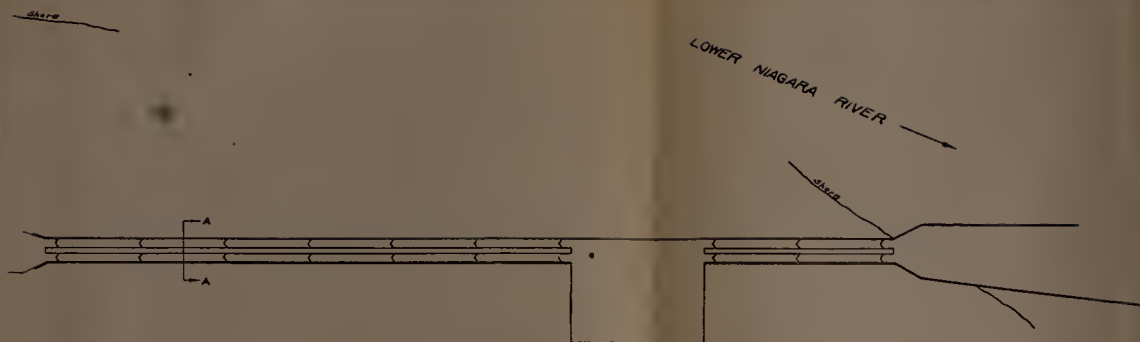
Transmitted with report

dated: Aug. 30, 1919

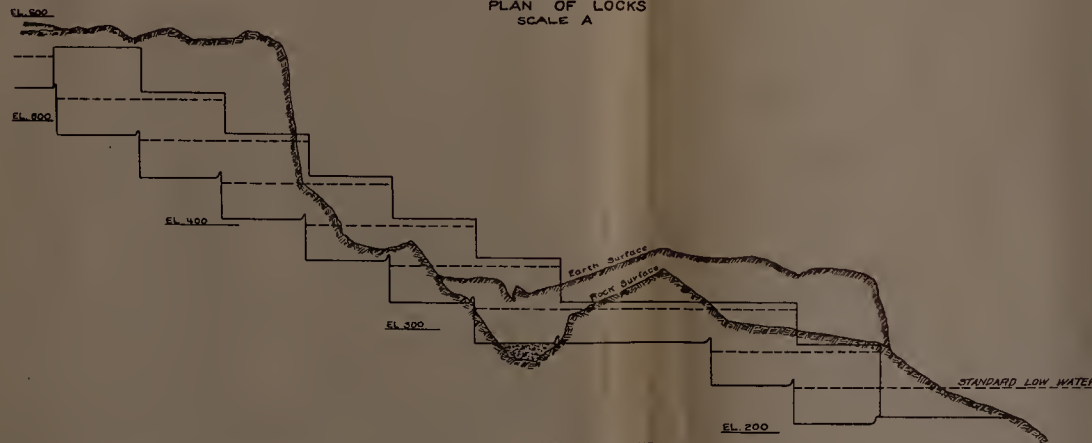




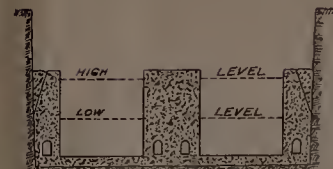
PLATE 51



PLAN OF LOCKS  
SCALE A



PROFILE OF LOCKS



SECTION A-A  
SCALE B

SHIP CANAL PROPOSITION  
LOCKS

In 2 Sheets Sheet No. 2 Scales as noted

Division Engineer Office, Lakes Division, Buffalo, N.Y. Aug., 1919

Submitted: *M. S. Richardson* Assistant Engineer Approved: *M. S. Richardson* Colonel, Corps of Engineers.

Drawn by *W. C. C.* File No. *---* Transmitted with report dated: Aug. 30, 1919

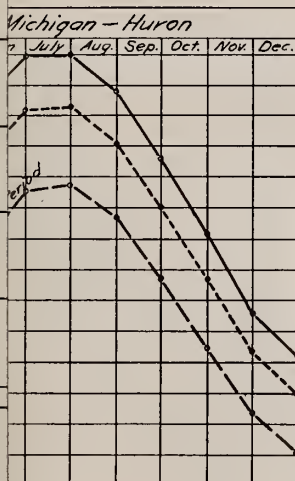


# Corps of Engineers, U. S. Army.

PLATE 53

PLATE 54

575.0



RELATION  
BETWEEN  
HURON AND ERIE

Sheet No. 1 Scale as noted

Office, Buffalo, N.Y. Aug., 1919

Approved:

Colonel, Corps of Engineers  
Transmitted with report  
dated: Aug. 30, 1919

EFFECT OF ICE

ON

ELEVATIONS OF LAKE MICHIGAN-HURON

In 1 Sheet. Sheet No. 1 Scale as noted.

Division Engineer Office, Buffalo, N.Y. Aug., 1919

Submitted:

Approved:

Assistant Engineer.

Colonel, Corps of Engineers

Drawn by

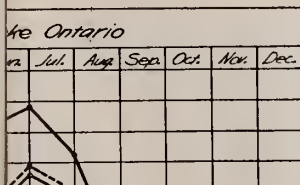
Transmitted with report

File No.

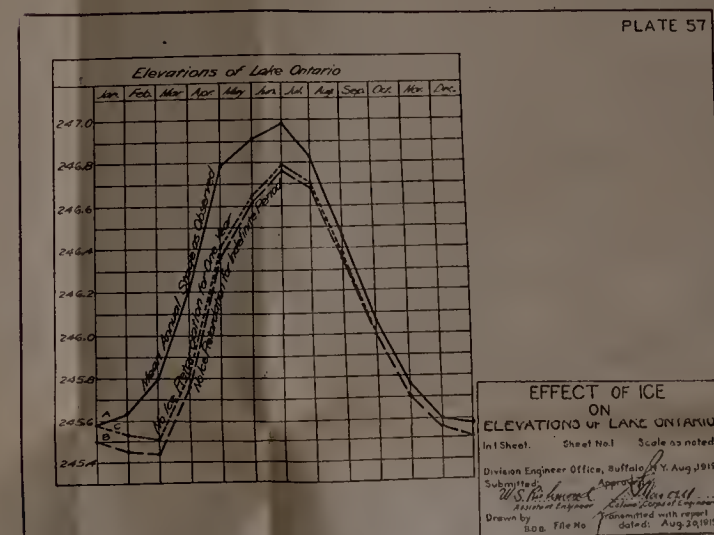
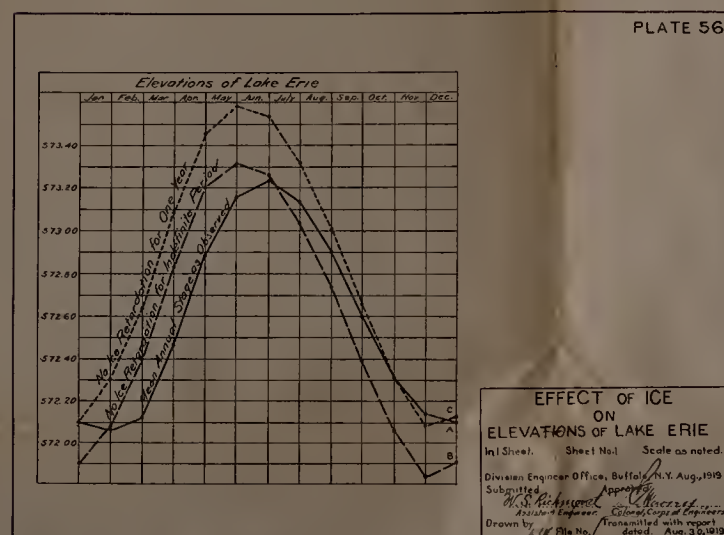
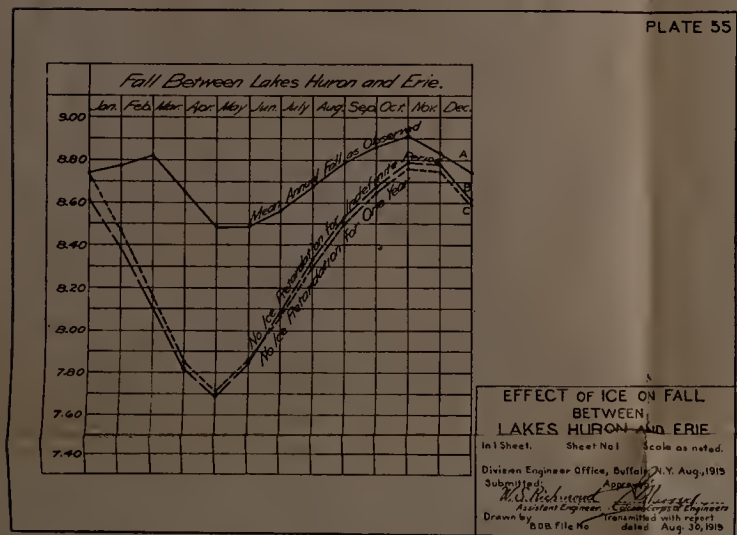
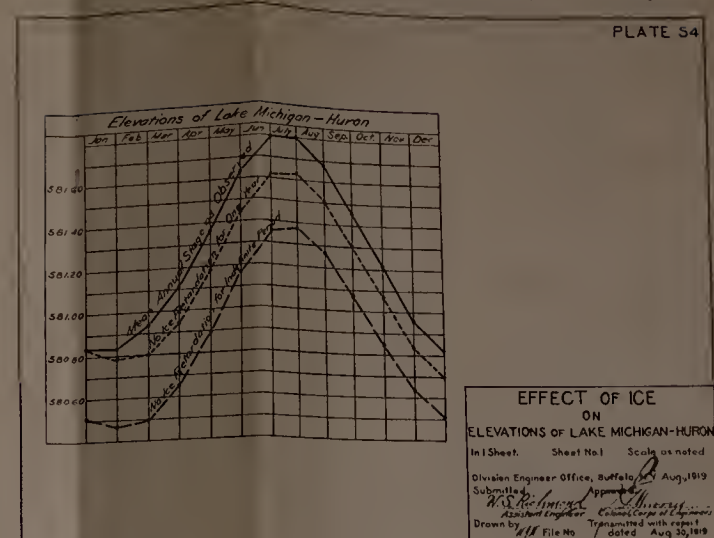
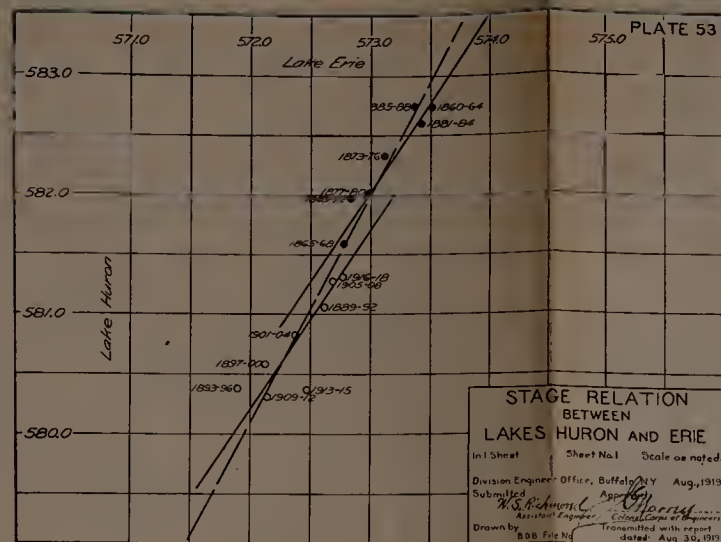
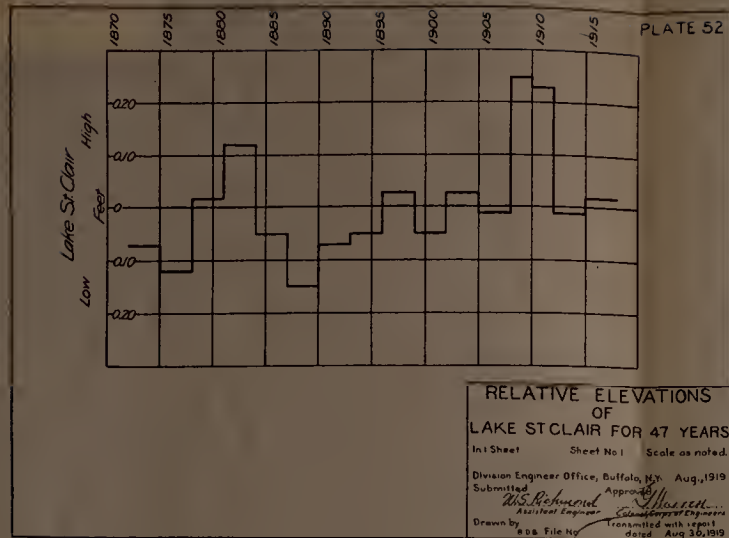
dated: Aug. 30, 1919

PLATE 56

PLATE 57







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Page: 1  
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Title: [illegible]  
Subject: [illegible]







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